

APPENDIX E

SITE CHARACTERIZATION REPORT

PHASE II - SITE CHARACTERIZATION REPORT

**University of California
Former Bay Area Research and Extension Center (BAREC)
90 North Winchester Boulevard
Santa Clara, California**

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LIST OF ACRONYMS

BAREC	Bay Area Research and Extension Center
bgs	below ground surface
Cal/EPA	California Environmental Protection Agency
CFR	Code of Federal Regulations
cm ²	Square centimeter
COPC	Chemical of Potential Concern
4,4'-DDD	4,4'-Dichlorodiphenyldichloroethane
4,4'-DDE	4,4'-Dichlorodiphenyldichloroethene
4,4'-DDT	4,4'-Dichlorodiphenyltrichloroethane
DTSC	Department of Toxic Substances Control
kg	Kilogram
LBNL	Lawrence Berkeley National Laboratory
m ³ /day	cubic meters per day
mg/cm ²	milligrams per square centimeter
mg/day	milligrams per day
mg/kg	milligrams per kilogram
mg/m ³	milligrams per cubic meter
mm of Hg	millimeters of mercury
MRL	Method Reporting Limit
MSL	Mean Sea Level
NA	Not Applicable
NCP	National Contingency Plan
ND	Not Detected
NR	Not Reported
PEA	Preliminary Endangerment Assessment
PRG	Preliminary Remediation Goal
R&D	Research and Development
T&CVSC	Town and Country Village Shopping Center
UC	University of California
UCL	Upper Confidence Limit
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound

EXECUTIVE SUMMARY

An environmental investigation was conducted at the former University of California (UC) Bay Area Research and Extension Center (BAREC) in Santa Clara, California (the Site). The overall purpose of this investigation was to determine whether current or past chemical use at the Site has resulted in soil concentrations that might pose a threat to public health and the environment. The State of California has closed the BAREC and plans to sell the property for development of single-family homes, open space and senior housing.

The BAREC was used as an agricultural research station since the 1920s. The primary research efforts at the BAREC have focused on improving crop production methods, irrigation systems, nutrition and variety characteristics of crops, and crop disease control. Part of this research has involved demonstrating the efficacy of a variety of research and development (R&D) pesticides. Monthly records of pesticide use were available from 1979 until the July 2002. These records indicated that small quantities of 90 different chemicals had been tested on crops at the Site. Fourteen of these 90 chemicals were considered of potential concern because of their toxicity and persistence in the environment. The remaining chemicals were not of potential concern because of their lack of persistence and/or low toxicity.

As a result of the application of pesticides to soil and the handling of pesticides on-site, over 50 samples of surface soil were collected to determine if surface soil in field plots and the greenhouses contained pesticide residues. These samples were analyzed for chemicals/pesticides that may persist in soil for many years following application. The chemicals analyzed included the 14 chemicals of potential concern, known to have been used at the Site, and 60 pesticides that were commonly used prior to 1979. Subsurface soil samples were also collected and analyzed from a former sewer leach pit, the former evaporation pond and sediment trap to determine if deeper subsurface soil and potentially ground water beneath the Site contained pesticide residues.

Arsenic and dieldrin were the chemicals of potential concern that were found at concentrations above USEPA Preliminary Remediation Goals (PRGs) in surface soils. Elevated concentrations of dieldrin were isolated and of limited horizontal and vertical extent. However, the mean dieldrin concentration in Field 1 exceeded the PRG primarily because of an isolated detection of dieldrin at a concentration of 240 ug/kg in surface soil. As a result, it is recommended that this "hot spot" of dieldrin be addressed such that the mean concentration in Field 1 will be below the PRG of 30 ug/kg.

Arsenic, a naturally-occurring inorganic chemical found in soil as well as in certain pesticides, was detected at concentrations above natural, background levels for Santa Clara. An additional 79 soil samples were collected and analyzed to define the extent of arsenic in soil at the site. An area in the eastern portion of Field 4 had elevated concentrations of arsenic in surface soils relative to background levels and other areas at the site. These results suggest that the elevated concentrations of arsenic in Field 4 may be a result of prior use of arsenical pesticides. There were also two additional areas that had isolated, elevated concentrations of arsenic: 1) adjacent to the road in front of the former screen house, a less than five square foot area of distressed vegetation had an elevated concentration (37 mg/kg) of arsenic in surface soil; and 2) between Field 11 and 12, there is an elevated concentration (27 mg/kg) of arsenic in surface soil.

Based on these results, a removal action is recommended to address the elevated concentrations of arsenic in the eastern sector of Field 4, and the three "hot spots" in surface soil. Removal of soils in this area would reduce potential health risks for future receptors to levels similar to those in the remaining and surrounding areas of the site.

With respect to the former sanitary sewer leach pit, the former evaporation pond and sediment trap, there is no evidence that subsurface soil and/or ground water has been adversely impacted as a result of their operation. No further investigation of subsurface soil and/or ground water is warranted based on these sampling results.

1.0 INTRODUCTION

This report presents the results of an environmental investigation conducted at the former University of California (UC) Bay Area Research and Extension Center (BAREC) in Santa Clara, California (the Site). This work was performed by ENVIRON International Corporation ("ENVIRON") in accordance with their agreement dated July 16, 2002 with DVP Associates on behalf of the State of California Department of General Services ("DGS").

The overall purpose of this investigation was to investigate whether current or past chemical use at the Site has resulted in soil concentrations that might pose a threat to public health and the environment. DGS plans to sell the former BAREC property for development of single-family homes, open space and senior housing.

This report is organized as follows: Specific sampling objectives and the scope of the Site investigation are presented in Section 2; Section 3 presents the physical characteristics of the Site; and, Section 4 discusses the nature and extent of contamination at the Site. The remainder of Section 1 presents background information regarding the Site.

1.1 SITE BACKGROUND

The Site is located at 90 North Winchester Boulevard in the city of Santa Clara, California. The location of the Site is presented on Figure 1. The Site is an approximately 17-acre, roughly rectangular-shaped property. As shown in Figure 2a, 12 small buildings are located on the eastern portion of the Site. The remainder of the property consists of agricultural fields, unpaved roadways and a paved parking area. The fields are identified by a number from one through twelve and cover a total of approximately eleven acres. Field 9 is enclosed by screens, which form a covered building over the field. Unpaved roadways provide access to the fields. The only paved area at the Site is the northwest corner of the property, where buildings 100, 103, 104, 105, 201 and 204 are located. This paved area was used for parking.

1.1.1 Site History

According to UC personnel, the Site was originally occupied by a veterans' widows home. Agricultural experimental field station operations at the Site began in 1928. The home remained in operation until the 1960s, when it was demolished and replaced with more agricultural fields. According to historical topographical maps, the name of the facility used to be Holderman Sanitarium. Based on a review of historical titles and deeds, obtained from

the DGS, four lots owned by Margaret Osborne were deeded to the State of California in 1921 and 1924. The four lots were incorporated into three lots, two of which were deeded by the State of California to the UC in 1952 and 1963. The third lot, located directly southwest of the Site, remained property of the State of California, and is currently occupied by an office building.

The field station's initial purpose was to assist farmers in the surrounding area. Until 1990, deciduous fruit trees (such as apples, citrus, cherries, almonds and ornamental) were planted to conduct research on fertilizers, irrigation, variety characteristics of crops, and crop disease control. This research included testing of pesticides and insecticides. As the surrounding area changed and became urban, the trees were replaced with various crops, such as strawberries, corn, tomatoes, beans and flowers. Since about 1995, eighty percent of the research at BAREC focused on crop improvement, whereas only twenty percent has involved pesticide use (UC, 2002). In early 2003, UC closed the BAREC. As part of closure, UC personnel removed all hazardous materials (i.e. fertilizers, pesticides, fuels, oils, cleaning solutions), portable tanks and trailers from the Site. The buildings and related utilities remain in place at the Site.

1.1.2 Description of the Former BAREC Operations

As stated above, a variety of crops have been planted on-site. In 2002, these crops included corn, tomatoes, beans, flowers, grass sod turf, and deciduous trees (e.g., apples, cherries, ornamental trees). Typically, within each of the 12 fields, a specific crop such as deciduous fruit trees or turf grass was grown. For research involving crop disease, select pesticides were applied to determine the efficacy at ameliorating the pest or disease of concern by UC researchers. The crops were routinely changed and, therefore, the pesticides applied to each field also changed. Brief descriptions of activities within certain areas of the Site are presented below.

- **Main Administration Building, Building 100 and Administrative Trailer Building 404.** The building contains administrative offices, a large meeting room and a dry laboratory. According to UC personnel, no chemicals were used in the laboratory. Soils were dried and weighed in preparation for outside analysis of chemical and physical properties. Additional administrative activities were undertaken in a portable trailer, Building 404. The trailer contains a small office and a dry laboratory for specimen preparation. No chemicals were used or stored in this building.
- **Greenhouses, Buildings 103, 104, and 105, and Potting Shed, Building 204.** Buildings 103 through 105 are fiberglass structures without floors that have been

historically used as greenhouses. In 2002, Greenhouse Building 103 stored compost bins; Greenhouse Building 104 stored planter boxes, old furniture and equipment. Greenhouse Building 105 was used to grow vegetables. The vegetables were grown in pots located on top of tables. Water and fertilizer were sprayed directly onto the plants. Some herbicide was sprayed occasionally between the tables to control weeds.

The potting shed is located adjacent to the greenhouses and was used to pot small plants before they were placed in the greenhouse. At the time of the Site visit in 2002, one small sink was located in this room. According to UC personnel, the sink was no longer in service, and was previously used exclusively to wash pots. The sink used to drain through a pipe to a 6-foot wide, 6-foot long underground wooden tank, located in Field 6. The depth of the tank is unknown. UC personnel indicated that the tank was accidentally broken, and that the pipe was subsequently plugged. No chemicals were reportedly used in the potting shed.

- **Pesticide Storage Shed, Building 208.** This building is, according to UC personnel, the only storage area for pesticides. The building is divided into two rooms. In the first room, a variety of pesticides were stored on shelves. Small quantities of pesticides were also mixed in this room and poured into 60-gallon tanks and backpacks for application in the field. A fume hood is located in the building and was used for mixing the pesticides. There are no drains or sinks in this room. The second room contained personal protective gear, showers and lockers for the employees using pesticides. A floor drain is located in this portion of the building that is currently connected to the City sanitary sewer. Prior to connection to the sewer, this floor drain discharged to an evaporation bed, (which is discussed in more detail below). No information is available regarding whether this drain existed prior to 1973 when the evaporation bed was constructed, and if it existed prior to 1973, where it discharged.
- **Equipment Wash System near Building 208.** An equipment wash system was located next to the pesticide shed (Building 208). It was installed in the early 1990s, according to UC personnel in the area formerly occupied by the evaporation bed (discussed below). It consisted of three aboveground tanks and a series of filters, and was used to wash the exterior of the fertilizer tanks. The interior of the fertilizer tanks were rinsed thrice in the field and the contents applied to the same field. The equipment wash system was removed by UC when BAREC operations ceased in early 2003.

- **Shop and Machinery Storage, Building 201 and Portable Military Trailer.** BAREC owned nine vehicles consisting of: three trucks, four tractors, one forklift and one car. These vehicles were serviced inside Building 201. According to UC personnel, the operations conducted inside this building consisted of oil changes and degreasing operations, in which a small amount of solvent was placed on rags and subsequently the rags were used to wipe the desired surface. The solvent was allowed to evaporate off the rags before they were discarded in the trash. Only small containers (less than one gallon) of a variety of solvents, lubricants, cleaning supplies and a small air compressor were stored in this building. According to UC records, the small quantities of solvents used were mineral-based and/or petroleum based (such as Stoddard). There is no record that Freon or other chlorinated solvents were used at the Site. In addition to the maintenance shop, the facility also stored used oil and used oil filters in a portable metal trailer located adjacent to Field 5. The portable metal trailer and its contents were removed from the Site by UC when operations ceased in early 2003.

According to UC personnel, the maintenance shop never had any hydraulic lifts or maintenance pits. In addition to the shop, the building also houses a walk-in refrigerator that was formerly used to store vegetables.

An equipment washer was located outside the building, although the current personnel have never used it. Historically, a steam cleaner was used just outside the shop, however it was stolen sometime before 1996, according to UC personnel. During ENVIRON's visit to the Site in July 2002, there were no visual signs of staining on the ground near Building 201 or inside the building.

- **Irrigation Pumphouse, Building 203.** An irrigation well is located inside this building. The current submersible pump is located at a depth of 200 feet below ground surface (bgs) and has a capacity of 500 gallons per minute (gpm). The well has not been used since UC closed the BAREC in early 2003. The well will be closed and abandoned prior to Site redevelopment.
- **Departmental Shed, Building 207.** This building is located in close proximity to the fields and is divided into several compartmentalized rooms with large barn doors for access. According to UC personnel, the building was used for storage of fertilizers, old equipment and furniture, and as parking for one of the tractors. Additionally, one room was used to grow mushrooms.

- **Aboveground Storage Tanks.** Two portable, double-walled 500-gallon aboveground storage tanks (ASTs) were located on-site in the vicinity of Field 5. Up until early 2003, the ASTs were on top of concrete pads. The date these tanks were installed is unknown but it was before 1996, according to UC personnel. It is likely they were installed after the USTs¹ were removed in 1993. The ASTs were removed from the Site by UC when BAREC operations ceased.

Additionally, there is a water tank next to the pump house that was used for water storage. Another water tank was installed next to the first one, but was never used.

1.1.3 Chemical Use

According to UC personnel, the following types of chemicals have been used on-site: pesticides and fertilizers for the crops; gasoline and diesel for the vehicles; paints and solvents for general maintenance. Most of these chemicals were stored in small quantities (i.e., less than five gallons) with the exception of diesel and gasoline, which was stored in double-walled 500-gallon ASTs, waste oil, (which was stored in drums in the portable metal trailer), and ammonium nitrate, (a fertilizer, stored in sacks in Building 207). There are no records of pesticide use prior to 1979². ENVIRON obtained pesticide application records from July 1979 to July 2002, which are summarized in Appendix A. Generally, these records indicate that small quantities of a wide variety of pesticides were used on different crops likely in different fields at the Site. The monthly records indicate the brand name, quantity, crop applied to, and size of the area applied. Additional discussion of pesticide use at the Site is discussed below in Section 2.1.

1.1.4 Previous Site Investigations

In 1993 and 1987, there were two environmental investigations at the Site. These investigations were related to removal of two underground fuel storage tanks and closure of an evaporation bed. Details of these investigations are described below.

1.1.4.1 Underground Storage Tanks

Two 1,000-gallon fuel tanks were formerly located on-site. The date of installation of the tanks is unknown. A 1000-gallon gasoline UST was located next to Building 201, and a 1000-gallon diesel UST was located next to Building 207 (see Figure 2a).

¹ USTs are discussed below in Section 1.1.4.1

² California regulations did not require records of pesticide use until 1980.

In 1993, UC personnel removed the USTs. The USTs were reportedly in good condition with no evidence of damage or leaks at the time of the removal. As part of removal activities, two samples were taken from approximately two feet below the bottom of the gasoline UST excavation, and one sample was taken from approximately two feet below the bottom of the diesel UST excavation. The soil samples were analyzed for gasoline, diesel, lead, benzene, toluene, ethylbenzene and xylenes. None of these constituents were detected. A letter dated October 7, 1993, from the City of Santa Clara Fire Department confirms that there was no sign of contamination, and that no further work was required.

1.1.4.2 Former Evaporation Bed

An evaporation bed was constructed in 1973 to dispose of diluted pesticide wastes. Rinsate from the washing of pesticide containers and application equipment was applied to the evaporation bed from 1973 to 1985. Use of the evaporation bed was discontinued in 1985 and inlets to the basin were sealed. In 1987, UC initiated an investigation to close the bed. Dames and Moore was retained to oversee closure activities and prepare the closure report.

According to the Dames and Moore closure report (Dames and Moore, 1988), the evaporation bed consisted of a lined soil evaporation bed, which was 20-feet long and 15-½-feet wide (Figure 2b). A translucent corrugated fiberglass roof shielded the bed from rainfall. A compacted earthen embankment covered by 2 inches of washed sand and a rubber liner formed the floor and walls of the bed. The fill in the evaporation bed consisted of 16 inches of sandy loam soil overlying a 6-inch layer of graded gravel and 2 inches of washed sand. Perforated bituminous fiber pipes in the gravel layer were connected to a distribution box within the bed. The distribution box was composed of pressure-treated wood. A 4-inch bituminous fiber pipe penetrated the liner on the east side of the bed and connected the distribution box to the sediment trap, located 5 feet east of the bed. The sediment trap consisted of a cylindrical concrete box, 3 feet in diameter and 6 feet deep, with a manhole cover. Because the elevation of the pipe carrying rinsate into the sediment trap was higher than that of the pipe carrying the rinsate out, heavier particles sank into the trap and were not carried to the evaporation bed. Two drains, one in the pesticide shed and one in the concrete wash slab, were connected to the sediment trap by a 4-inch plastic pipe and a 4-inch cast iron pipe, respectively.

The rinsing occurred in a concrete wash slab adjacent to the pesticide storage shed (Building 208). Rinsate drained first into the sediment trap from which sediment was

cleaned out periodically and distributed on the evaporation bed. From the sediment trap water flowed into the distribution box of the evaporation bed where perforated pipes connected to the distribution box dispersed the diluted pesticide solutions throughout the bed's gravel layer. Capillary forces in the loam soil drew the rinsate solution up through the overlying soil to evaporate at the surface. Hydrated lime (calcium hydroxide) was tilled into the soil bed to increase the soil pH, which reportedly accelerated the breakdown of organophosphate and carbamate pesticides.

The liner in the evaporation bed was composed of two sheets of 20-mil-thick nylon-reinforced butyl rubber liner, spliced together on-site. The liner was inspected carefully during bed removal activities and appeared to be in good condition. At the time the Dames & Moore report was written, there was no history of leaks or repairs to the liner at the Site.

Prior to its removal, the evaporation bed was sampled in July 1987 by UC staff. The bed was divided into 16 quadrants of approximately equivalent size; one sample from each quadrant was collected for depths of zero to 12 inches. A composite sample of all 16 samples was submitted for analysis. Sample results are summarized in Table 1.

The UC, with the assistance of Dames & Moore, removed the evaporation bed in October 1987. All materials were excavated from inside of the liner and the liner was checked for integrity. After the liner was removed, the underlying two inches of soil were excavated from the bed to minimize any possible residual contamination.

Four samples were collected from the bottom of the evaporation bed excavation after the liner was removed. The carbamate pesticide chlorpropham was reported at a concentration of 2.8 mg/kg in one of the samples. No other pesticides or herbicides were detected in the four samples collected below the former evaporation bed. Sample results are summarized in Table 2. Dames & Moore concluded that there was no indication that the operation of the former evaporation bed had a significant impact on the environment.

1.2 POTENTIAL SOURCES OF CONTAMINATION

The results of the two previous environmental investigations show no evidence of environmental contamination as a result of prior operation of the USTs and evaporation bed at the Site. However, these prior investigations were limited to the USTs and evaporation bed and did not investigate other areas of the Site that may have been impacted by prior pesticide use. Based on the Site history, there appear to be additional sources of potential

environmental contamination that require further investigation. These potential sources are discussed below and include:

- **Current and Historical Pesticide Use on Crops**

Since the 1920s, the Site has been used as an agricultural research station. As a result of the application of pesticides to soil and the handling of pesticides on-site, it is possible shallow surface soil in field plots and the greenhouses may contain pesticide residues. It is unlikely that deeper soils (i.e. greater than 3 feet) were impacted from prior pesticide/fertilizer use. Since crops were planted in small plots by individual researchers, crop tilling methods involved use of manual labor or small tractors, which typically mixed only the top 12 to 18 inches of soil.

- **Historical Wastewater Discharges**

Sanitary wastewater generated from the main administrative building, Building 100, is currently discharged into the City of Santa Clara sewer system. According to UC documentation, the connection to the city system occurred in 1977. However, prior to 1977, wastewater from these buildings was discharged into a sewage leach pit (or "cesspool"). According to a drawing dated April 1, 1977, the leach pit/cesspool was approximately four feet wide, six feet long and four feet deep, and was located between buildings 201 and 100 as shown on Figure 2a. The former presence of this sewer leach pit raises the possibility that deeper subsurface soil and potentially ground water beneath the Site may contain pesticide residues from discharges to sanitary sewer system.

- **Former Evaporation Pond and Sediment Trap**

The arsenic detection limits for samples analyzed in October 1987 following removal of the bed were above typical background arsenic concentrations. As a result, it is unknown whether concentrations of arsenic above typical background levels remain in soil beneath the former evaporation pond. Also, the sediment trap, which is adjacent to the pesticide shed and evaporation pond, was not sampled during pond closure activities and so it is unknown whether the sediment trap adversely affected subsurface soil.

Further surface and subsurface environmental investigation are necessary to determine whether these potential sources of contamination have adversely impacted soil and/or ground water at the Site. This report presents the scope and results of an environmental investigation to determine the potential impact from these sources.

2.0 SCOPE OF INVESTIGATION

To determine whether pesticide use at the Site had impacted surface and near surface soils at the Site, soil samples were collected during two phases of investigation at the Site. The sampling density was based on DTSC's: "Interim Guidance for Sampling Agricultural Soils for School Sites" dated August 26, 2002 ("DTSC Guidance"). Soil samples were collected from the Site initially on July 31 and August 1, 2002. Additional samples were collected in second and third phases of investigation on September 23, 2002 and April 1, 2003.

Soil samples were collected at each of the twelve field plots and from the greenhouse floor to depths of 3 feet bgs on July 30 and August 1, 2002 using a hand auger and an Arts-brand hand-sampling device. The samples were collected in 2-inch inner diameter by 6-inch-long stainless-steel sample tubes hammered directly into the ground using the Arts sampler after hand auguring to a specific depth. During the September 23, 2002 sampling event, a 1.75-inch diameter by 6-inch-long stainless-steel liner was placed inside a hollow stem hand auger upon reaching the desired sample depth. An additional soil sample was collected by this means on April 1, 2003 in a small area of distressed vegetation adjacent to the road in front of the former screen house. After sample tubes were extracted from the ground, the ends were covered with TeflonTM tape and sealed with plastic end caps and silicone tape. The samples were labeled indicating the project number, sample ID number, date and time of sample collection, and initials of the sampler. The label was placed directly onto the side of the stainless-steel sample sleeve. Each sample was then placed in a re-sealable ZiplockTM type plastic bag and sealed. Samples were packed in insulated coolers containing ice and picked up by the analytical laboratory the following morning after sample collection.

To investigate releases from the former sewer leach pit, former evaporation pond, sediment trap, and to collect soil samples from depths greater than 3 feet bgs in the field plots, direct-push soil borings were installed at specific locations using a GeoprobeTM direct-push sampling rig equipped with a hydraulic driving/hammering system. Direct-push sampling was performed on September 23, 2002 and April 1, 2003. The GeoprobeTM system uses 2-inch outer diameter (OD) stainless-steel probes to collect soil samples in 1.75-inch OD stainless steel sample sleeves. Probes were advanced and samples collected from specified intervals beginning at each sampling location. Direct-push soil samples were collected in 6-inch long by 1.75-inch OD stainless-steel sampling sleeve for transport to the analytical laboratory. Immediately after a sample was collected, the ends of the stainless-steel sleeves were covered with Teflon tape and sealed with plastic end caps and silicone tape. The

samples were labeled and packaged in the same manner as the hand auger samples, as described above.

At the end of each sampling day sample information was written on chain-of-custody (COC) forms. Information entered onto the form included the sample ID number, sample matrix, date of sample collection, location and depth of sample, and requested analyses. Each COC form consisted of three carbon copy sheets, two of which were placed in the appropriate sample shipping cooler for laboratory use, with the third sheet being retained by the Field Manager. COC forms were placed in adhesive plastic windows and affixed to the inside of the shipping cooler lid. Coolers were then closed, sealed with duct tape, and custody seals affixed to each cooler to enable detection of tampering.

2.1 CHEMICALS OF POTENTIAL CONCERN

Samples from field plots were analyzed for a variety of pesticides and metals. To determine chemicals of potential concern (COPCs) and the specific constituents for which the samples should be analyzed, a review of pesticide use records from 1979 to 2002 was conducted. According to these records, the BAREC tested small quantities of 90 different chemicals at the Site since 1979. Given that the Site has likely conducted agricultural testing of chemicals since the 1930's, it is likely there are other chemicals that were used prior to 1979, although no written records are available to document their use. The chemicals of greatest potential concern at the Site are those that persist in the environment. DTSC Guidance states that for the majority of newer pesticides persistence or "half-life" is limited to a few days (DTSC, 2002). The DTSC Guidance recommends testing for organochlorine pesticides since these compounds can persist in soil at levels of health concern for many years following application. The DTSC Guidance also recommends testing for anaerobically stable pesticides such as ametryn. Ametryn is a triazine herbicide. Based on DTSC Guidance, organochlorine (OC) pesticides and triazine herbicides (including ametryn) were analyzed in soil at the Site. The specific OC pesticides and triazine herbicides tested are listed in Table 3.

Of the 90 chemicals known to have been used at the Site since 1979, soil samples were analyzed for 14 of these chemicals and are listed as COPCs in the Table 3. These chemicals fall into general categories of chemicals: organophosphorous pesticides, carbamate and urea pesticides, chlorinated herbicides and inorganics/heavy metals. Other chemicals typical of these chemical categories may also have been used at the Site, but there are no written records of pesticide use prior to 1979. Soil samples were analyzed for inorganic chemicals because heavy metals may have been applied to the fields as pesticides and fertilizers. Soil

samples were analyzed for the specific organophosphorous pesticides, carbamate and urea pesticides, chlorinated herbicides, and inorganic chemicals listed in Table 3. Soil samples were also tested for diquat and paraquat because there are written records of their use at the Site. Soil pH was also tested since some of the chemicals used at the Site were acids or bases. An elevated or low pH in soil could indicate a release of these chemicals.

There are 76 chemicals that were listed in pesticide use records but were not identified as COPCs and not analyzed for at the Site. These 76 chemicals were not included for several reasons. First, a chemical's lack of persistence in the environment or short half-life justified exclusion as a COPC for the Site. DTSC Guidance states that it is not necessary to analyze for chemicals with short persistence in the environment. Twenty-eight of these 76 chemicals have half-lives indicating that at least 99.99% of the mass would be removed by August 2002 given the last year of its usage. The mass removed is estimated from the half-life using the following formula:

$$M = 1 - e^{-\frac{\ln 0.5}{t_{0.5}} t}$$

- where M is fraction mass removed;
- t is time elapsed where current time is October 2002 and time of last application is assumed to be at the end of the year of last use or July 2002 for chemicals used in 2002; and
- $t_{0.5}$ is half-life as provided by EXTTOXNET (Extension Toxicology Network Pesticide Information Profiles, ARS (USDA Agricultural Research Service Pesticide Properties Database), or Agency for Toxic Substances & Disease Registry (ATSDR 1991).

Table 3a shows the 28 chemicals, their half-lives, the last dates of usage and the estimated mass removed.

Eleven of the remaining 48 chemicals were not included as COPCs because the quantities used would result in very low concentrations in soil. To estimate the concentrations of these 11 chemicals, the mass of the chemical used each month and the area applied was obtained from monthly pesticide records. Using this mass and area information and making the conservative assumption that the chemical was not diluted with inert ingredients, the chemical's concentration in soil was estimated. This estimate assumed a soil mixing depth of 6 inches and a soil bulk density of 1600 kg/m³. Even without taking into accounts the effects

of degradation based on half-life or chemical volatilization information, the concentrations of these 11 chemicals were well below the USEPA Region IX Preliminary Remediation Goals (PRGs)³ for residential land use. Table 3b presents the estimates of soil concentration for these 11 chemicals.

Thirty-seven chemicals remain of the 76 compounds that were listed in pesticide use records but were not identified as COPCs and not analyzed for at the Site. These 37 chemicals are listed in Table 3c and the rationale for not analyzing these chemicals is also summarized in the Table 3c. Concentrations were estimated for most of these chemicals using the same assumptions as for the chemicals in Table 3b. Contrary to the chemicals listed in Table 3b, however, these 37 chemicals do not have PRGs and many do not have half-life information. Where half-life information was available, estimated concentrations were adjusted as noted in the table. In addition, in some cases, concentrations were also adjusted to take into account dilution by other inert ingredients in the pesticide mixture. The resulting estimated concentrations for the chemicals listed in Table 3c are very low and as such, these chemicals were not analyzed for at the Site.

Several of the substances listed in Table 3c are also noted as having low toxicity. This designation is assigned to the substances, which are essentially inert ingredients such as kaolin clay, lignosulfate salts, fatty acid salts, maize gluten meal (cornmeal), sulphur and the various oil sprays that are commonly sprayed on plants. The bacteria GHA is also noted as having low toxicity, based on a determination made by the USEPA. USEPA stated that the bacteria should be exempt from the requirement of setting a tolerance because testing had shown that the organism did not exhibit toxic or infective properties (Federal Register 95-7452, March 22, 1995).

2.2 NUMBER AND LOCATION OF SAMPLES

DTSC Guidance states that when differing agricultural crops are produced on different areas of a site, each area should be addressed separately and the sampling rate should be sufficient to characterize each area. Since each field plot at the Site contains or may have contained different crops at different times, the number of samples per field was based on the size of each field plot and the recommended number of sampling locations listed in Table 1 of the DTSC Guidance. For example, based on Table 1 in the DTSC Guidance, if the field plot was between one and two acres, a minimum of four discrete samples should be collected or approximately one sample every ¼-acre. Where possible and based on the DTSC Guidance,

³ USEPA Region IX PRGs were used for screening purposes only. The PRGs used for comparison are for residential soil from: November 1, 2000, *USEPA Region 9 Preliminary Remediation Goals (PRGs)*.

a minimum of one sample was collected for every ¼-acre in each field plot. Sampling locations are shown on Figure 3, and Table 4 lists the analyses performed for each sample collected. The scope of the field investigation is discussed below.

2.2.1 Field 1

Field 1 is slightly less than one acre. During the first phase of investigation, soil samples were collected at four locations in Field 1 at depths of 0.5 and 3 feet bgs (Figure 3). These soil samples were analyzed for the COPCs (except paraquat and diquat) listed in Table 3. Initially, only soil samples from depths of 0.5 bgs were analyzed. Upon receipt of laboratory analytical results, all four samples from 3 feet bgs were analyzed for arsenic, and one sample from 3 feet bgs from location F1-C was analyzed for organochlorine pesticides. During the second phase of investigation in September 2002, an additional soil sample was collected at a depth of 0.5 bgs from the center of Field 1 and analyzed for paraquat and diquat.

2.2.2 Field 2

Field 2 is just over one acre in size. During the first phase of investigation, soil samples were collected at four locations in Field 2 at depths of 0.5 and 3 feet bgs (Figure 3). These soil samples were analyzed for the COPCs (except paraquat and diquat) listed in Table 3. Initially, only soil samples from depths of 0.5 bgs were analyzed. Upon receipt of laboratory analytical results, all four samples from 3 feet bgs were analyzed for arsenic. During the second phase of investigation in September 2002, an additional soil sample was collected at a depth of 0.5 bgs from the center of Field 2 and analyzed for paraquat and diquat.

2.2.2.1 Grassy Area Next to the Former Screen House

During a third phase of investigation in April 2003, a distressed area of grass was identified next to the access road that runs along the eastern edge of Field 2. With the exception of this small patch of brown grass, the surrounding area and vegetation was very green and heavily vegetated as a result of the heavy rainfall that occurred in Spring 2003. One shallow sample was collected from soil in the brown grassy area and analyzed for organochlorine pesticides by EPA Method 8081 and metals/inorganics by EPA Method 6010.

2.2.3 Field 3

Field 3 is just over 1.5 acres in size. During the first phase of investigation, soil samples were collected at six locations in Field 3 at depths of 0.5 and 3 feet bgs (Figure 3). These soil samples were analyzed for the COPCs (except paraquat and diquat) listed in Table 3.

Initially, only soil samples from depths of 0.5 bgs were analyzed. Upon receipt of laboratory analytical results, all six samples from 3 feet bgs were analyzed for arsenic, and five samples from 3 feet bgs from locations F3-A, F3-B, F3-D, F3-E and F3-F were analyzed for organochlorine pesticides. During the second phase of investigation in September 2002, an additional soil sample was collected at a depth of 0.5 bgs from the center of Field 3 and analyzed for paraquat and diquat.

2.2.4 Field 4

Field 4 is just over two acres in size. During the first phase of investigation, soil samples were collected initially at eight locations in Field 4 at depths of 0.5 and 3 feet bgs (Figure 3). These soil samples were analyzed for the COPCs (except paraquat and diquat) listed in Table 3. Initially, only soil samples from depths of 0.5 bgs were analyzed. Upon receipt of laboratory analytical results, all eight samples from 3 feet bgs were analyzed for arsenic.

During the second phase of investigation in September 2002, an additional soil sample was collected at a depth of 0.5 bgs from the center of Field 4 and analyzed for paraquat and diquat. Samples were also collected from an additional 4 locations at a depth of 0.5 feet bgs from the western portion of Field 4 for analysis of arsenic and organochlorine pesticides. These samples were collected because this portion of Field 4 was inaccessible during the first phase of sampling. These samples were analyzed only for organochlorine pesticides and arsenic because these were the only constituents detected at concentrations above PRGs during the first phase of investigation⁴. Samples were also collected from an additional 11 locations at depths of 0.5, 2 and 3 feet bgs to define the extent of elevated concentrations of arsenic identified in the eastern portion of Field 4 during the first phase of investigation. Direct-push borings were also installed at locations F4-C, F4-E and F4-F in the eastern portion of Field 4. Samples were collected from these borings and analyzed for arsenic to define the vertical extent of arsenic below 3 feet bgs in this area of Field 4.

2.2.5 Field 5

Field 5 is just over one acre in size. During the first phase of investigation, soil samples were collected at four locations in Field 5 at depths of 0.5 and 3 feet bgs (Figure 3). These soil samples were analyzed for the COPCs (except paraquat and diquat) listed in Table 3. Initially, only soil samples from depths of 0.5 bgs were analyzed. Upon receipt of laboratory analytical results, all four samples from 3 feet bgs were analyzed for arsenic. During the

⁴ As stated above, USEPA Region IX PRGs were used for screening purposes only. The PRGs used for comparison are for residential soil from: November 1, 2000, *USEPA Region 9 Preliminary Remediation Goals (PRGs)*.

second phase of investigation in September 2002, an additional soil sample was collected at a depth of 0.5 bgs from the center of Field 5 and analyzed for paraquat and diquat.

2.2.6 Field 6

Field 6 is just over ½-acre in size. During the first phase of investigation, soil samples were collected at three locations in Field 6 at depths of 0.5 and 3 feet bgs (Figure 3). These soil samples were analyzed for the COPCs (except paraquat and diquat) listed in Table 3. Initially, only soil samples from depths of 0.5 bgs were analyzed. Upon receipt of laboratory analytical results, all three samples from 3 feet bgs were analyzed for arsenic. During the second phase of investigation in September 2002, an additional soil sample was collected at a depth of 0.5 bgs from the center of Field 6 and analyzed for paraquat and diquat.

2.2.7 Field 7

Field 7 is less than two acres in size. During the first phase of investigation, soil samples were collected at eight locations in Field 7 at depths of 0.5 and 3 feet bgs (Figure 3). These soil samples were analyzed for the COPCs (except paraquat and diquat) listed in Table 3. Initially, only soil samples from depths of 0.5 bgs were analyzed. Upon receipt of laboratory analytical results, all eight samples from 3 feet bgs were analyzed for arsenic. During the second phase of investigation in September 2002, an additional soil sample was collected at a depth of 0.5 bgs from the center of Field 7 and analyzed for paraquat and diquat.

2.2.8 Field 8

Field 8 is just over one acre in size. During the first phase of investigation, soil samples were collected at four locations in Field 8 at depths of 0.5 and 3 feet bgs (Figure 3). These soil samples were analyzed for the COPCs (except paraquat and diquat) listed in Table 3. Initially, only soil samples from depths of 0.5 bgs were analyzed. Upon receipt of laboratory analytical results, all four samples from 3 feet bgs were analyzed for arsenic. During the second phase of investigation in September 2002, an additional soil sample was collected at a depth of 0.5 bgs from the center of Field 8 and analyzed for paraquat and diquat.

2.2.9 Field 9

Field 9 is less than ¼-acre in size. As mentioned above, Field 9 is completely enclosed by screens. During the first phase of investigation, soil samples were collected at one location in Field 9 at depths of 0.5 and 3 feet bgs (Figure 3). Initially, only the soil sample from a depth of 0.5 bgs was analyzed for the COPCs (except paraquat and diquat) listed in Table 3. Upon receipt of laboratory analytical results, the sample from 3 feet bgs was analyzed for

arsenic. During the second phase of investigation in September 2002, an additional soil sample was collected at a depth of 0.5 bgs from Field 9 and analyzed for paraquat and diquat.

2.2.10 Field 10

Field 10 is just over ½-acre in size. During the first phase of investigation, soil samples were collected at two locations in Field 10 at depths of 0.5 and 3 feet bgs (Figure 3). These soil samples were analyzed for the COPCs (except paraquat and diquat) listed in Table 3. Initially, only soil samples from depths of 0.5 bgs were analyzed. Upon receipt of laboratory analytical results, all two samples from 3 feet bgs were analyzed for arsenic. During the second phase of investigation in September 2002, an additional soil sample was collected at a depth of 0.5 bgs from Field 10 and analyzed for paraquat and diquat.

2.2.11 Field 11

Field 11 is less than ½-acre in size. During the first phase of investigation, soil samples were collected at two locations in Field 11 at depths of 0.5 and 3 feet bgs (Figure 3). These soil samples were analyzed for the COPCs (except paraquat and diquat) listed in Table 3. Initially, only soil samples from depths of 0.5 bgs were analyzed. Upon receipt of laboratory analytical results, all two samples from 3 feet bgs were analyzed for arsenic. During the second phase of investigation in September 2002, an additional soil sample was collected at a depth of 0.5 bgs from Field 11 and analyzed for paraquat and diquat.

2.2.12 Field 12

Field 12 is less than ½-acre in size. During the first phase of investigation, soil samples were collected at one location at the edge of Field 12 at depths of 0.5 and 3 feet bgs (Figure 3). Initially, only the soil sample from a depth of 0.5 bgs was analyzed for the COPCs (except paraquat and diquat) listed in Table 3. Upon receipt of laboratory analytical results, the sample from 3 feet bgs was analyzed for arsenic. During the second phase of investigation in September 2002, an additional soil sample was collected at a depth of 0.5 bgs from Field 12 and analyzed for arsenic, paraquat and diquat.

2.2.13 Greenhouse Building 103

Soil samples were collected from one location of the floor in Greenhouse Building 103 at depths of 0.5 and 3 feet bgs (Figure 3). The other two greenhouses were not sampled because the floor was inaccessible due to ongoing activities in each of the buildings. Initially, only the soil sample from a depth of 0.5 bgs was analyzed for the COPCs (except paraquat and diquat) listed in Table 3. Upon receipt of laboratory analytical results, the

sample from 3 feet bgs was analyzed for arsenic.

2.2.14 Former Sewer Leach Pit

A direct-push soil boring was installed at two adjacent locations at the former sewer leach pit between Buildings 100 and 201. Initially, one boring was installed to approximately 7 feet bgs directly in the bottom of the leach pit. A sample was collected for analysis at approximately 7 feet bgs. However, the boring could not extend deeper because wood and concrete was encountered in the borehole. A second boring was installed approximately 3 feet away and a sample was obtained for analysis from this borehole at 10 feet bgs. Samples from the former leach pit were analyzed for volatile organic compounds (VOCs) by EPA Method 8260B, semi-volatile organic compounds (SVOCs) by EPA Method 8270C, organochlorine pesticides by EPA Method 8081, total petroleum hydrocarbons (TPH) as gas, diesel and motor oil fractions, and metals/inorganics by EPA Method 6010.

2.2.15 Former Evaporation Pond and Sediment Trap

In the center of the former evaporation pond, soil samples were collected from depths of 2, 3.5, 6.5 and 7.8 feet bgs and analyzed for arsenic. A sample was collected from the liquid inside the sediment trap and analyzed for organochlorine pesticides by EPA Method 8081 and metals/inorganics by EPA Method 6010. Soil samples were also collected at depths of 3.5 and 8.5 feet bgs from a soil boring adjacent to the sediment trap, but below the bottom of the sediment trap. Since organochlorine pesticides were not detected in the water sample from the sediment trap and metals concentrations were low, the soil samples were only analyzed for arsenic.

2.2.16 Background Location

Soil samples were collected from one location at the north end of the parking lot near Building 100. The purpose of this sample was to determine ambient levels of pesticides or metals in areas, which are not known to have been impacted by former BAREC agricultural operations. DTSC Guidance suggests that four samples should be collected to determine background concentrations; however, only one small area of the Site, which was outside of buildings, was identified where there was no known pesticide/chemical use. Since the area surrounding the Site is highly urbanized, there were also no offsite areas where representative background samples could be collected. Initially, only the soil sample from a depth of 0.5 bgs was analyzed for the COPCs (except paraquat and diquat) listed in Table 3. Upon receipt of laboratory analytical results, the sample from 3 feet bgs was analyzed for arsenic.

3.0 PHYSICAL CHARACTERISTICS OF THE SITE

This section describes the general physical characteristics of the Site. Information on the general physical characteristics of the Site was obtained during visits to the Site, interviews with individuals knowledgeable about the Site, a review of regulatory agency files regarding the Site and an adjacent property, and a review of documents provided by the UC.

3.1 SURROUNDING AREA LAND USE

The 17-acre Site is located approximately three and one half miles south of downtown Santa Clara, California (Figure 1). The area surrounding the Site consists primarily of residential and commercial land. Immediately surrounding the Site to the north, west and south are residential homes. To the south of the Site along Winchester Boulevard, there is a commercial building, a veterinary clinic and parking lot. To the east and southeast beyond Winchester Boulevard, are a large shopping mall (Valleyfair West Mall), a bank, and several restaurants. To the northeast of the Site are more restaurants and Dunn-Edwards Paints, a paint supply company.

3.2 SITE TOPOGRAPHY

The Site is flat at a topographic elevation of approximately 125 feet above mean sea level (MSL). Based on a review of the USGS San Jose West Topographic Map, the nearest surface water bodies appear to be an intermittent stream, Saratoga Creek, situated one and one-half mile northwest of the Site and an intermittent river, Los Gatos Creek, situated two and one-half miles to the southeast. Additionally, a review of the historical topographical maps showed another intermittent stream, San Tomas Aquinas Creek, situated three-quarters of a mile west of the property. San Tomas Expressway currently appears to overlie this creek.

In general, the topography of the area slopes in a northeasterly direction. Site personnel were not aware of any flooding at the Site. Flood information from the Federal Emergency Management Agency (FEMA) Santa Clara County map indicates the Site is located within a 500-year flood zone. Based on wetlands information compiled by the U.S. Fish and Wildlife Service, the Site does not appear to contain any wetlands. ENVIRON did not observe any vegetation indicative of wetlands at the time of the Site visit.

3.3 CLIMATE

Mean annual rainfall in the general vicinity of the Site is approximately 16 inches (41 cm) with mean monthly rainfall of 1.75 inches (4.4 cm) (US Department of Commerce, 1983).

Median annual Class A pan evaporation rate is 55 inches which indicate that evaporation rates tend to exceed rainfall rates (US Department of Commerce, 1983).

Monthly mean temperatures average approximately 55 degrees Fahrenheit (°F), with temperature extremes that range from 35°F to 90°F. The mean daily temperature during the winter months (January and February) is 40°F, and in the hottest summer month (August), 70°F (US Department of Commerce, 1983).

3.4 GEOLOGY

Geologic information was based on information in the Dames and Moore report regarding the closure of the former evaporation bed. The Site is located near the center of the South Bay hydrologic sub-basin of the San Francisco Bay hydrologic basin, which is located in the Coast Ranges geomorphic province. The Coast Ranges geomorphic unit is characterized by predominantly northwest trending mountains, valleys and faults. The South Bay unit is a broad alluvial valley sloping north toward San Francisco Bay. The Site is underlain by Quaternary alluvium deposited by streams that merge near the center of the San Jose Alluvial Plain and flow north toward San Francisco Bay. The alluvium is composed of unconsolidated interbedded gravel, sand silt and clay. The alluvium becomes progressively finer-grained northward toward the Bay and contains a series of laterally extensive marine clay layers.

Dames and Moore interprets the Site to be within or on the margin of the area underlain by extensive clay layers. According to documentation provided by the UC for the irrigation well at the Site, interbedded gravel, sand, and clay was observed at the Site to a depth of 39 feet. The gravel was underlain by layers of clay, sandy clay, gravelly clay and gravel to a depth of 360 feet. Blue clay was reported at depths of 70 to 75 feet, 105 to 119 feet, 239 to 244 feet, and 261 to 272 feet, which is consistent with Dames and Moore's interpretation that the Site is on the margin of the area underlain by extensive clay layers.

3.5 GROUND WATER

According to the Dames and Moore report, most water wells in the San Jose Alluvial Plain withdraw ground water from the Quaternary alluvium. Four correlatable regional aquifers

have been identified in the alluvial plain; the 60-foot, 250-foot, 350-foot, and 450-foot aquifers. Most major producing wells in the Santa Clara area withdraw water from a zone 150 to 250 feet below ground surface under confined or semi-confined conditions. BAREC personnel indicate that one groundwater well is located on-site. It is located inside the pump house and is used for irrigation of the fields. The well at the Site is screened from a depth of 200 to 250 feet below ground surface (bgs); the depth to groundwater in this well is 140 feet and approximately 3.7-million gallons are pumped annually. A report by Environmental Data Resources, Inc. (EDR) identified nine additional active wells within a one-mile radius of the Site. The wells are operated by O'Connor Hospital, the San Jose Water Company, the City of San Jose, and the City of Santa Clara. No additional information about these wells was found.

There is no Site-specific information on shallow ground water at the Site. ENVIRON reviewed a Soil and Ground Water Report prepared by McCulley, Frick & Gilman, Inc. for the Dunn-Edwards Corporation Facility located at 690 Winchester Boulevard, approximately 1/8 mile north of the Site. The report indicated that shallow ground water was encountered between 20 and 30 feet bgs and that shallow ground water flowed towards the Bay to the east.

4.0 NATURE AND EXTENT OF CONTAMINATION

This section presents the results of laboratory analyses of soil samples collected from the Site, and in the context of these results, the nature and extent of chemicals in soil at the Site. The term “nature” refers to the type and concentration of chemicals released, while the term “extent” refers to the spatial distribution of the chemicals in environmental media (i.e., soil).

4.1 FIELD PLOT/GREENHOUSE SAMPLING RESULTS

The results of analyses of soil samples from the Site indicate that only seven organochlorine pesticides, diquat and thirteen inorganic compounds were detected. Triazine pesticides, organophosphorous pesticides, chlorinated herbicides, paraquat, carbamate pesticides and urea pesticides were not detected in any of the samples analyzed. Laboratory results are provided in Appendix B. A statistical summary of the compounds detected and comparison to USEPA Region IX PRGs⁵ is provided in Table 5.

Of the pesticides, 4,4'-DDT, 4-4'DDE and diquat were detected the most frequently at a rate of about 66 percent in the samples analyzed. Dieldrin was detected the next most frequently at a rate of about 25 percent while chlordane and endrin were detected at a frequency of less than 10 percent. Only one detection of heptachlor epoxide was reported in the 59 samples analyzed.

A comparison of the pesticide results with USEPA Region IX PRGs showed that only dieldrin exceeded the PRG for samples collected at 0.5 feet bgs. Exceedences of the PRGs occurred in one sample from Field 1 and two samples from Field 3. As a result, samples collected at 3 feet bgs from these locations (in addition to 3 more locations in Field 3 and one location in Field 7⁶) were analyzed for organochlorine pesticides. For samples from 3 feet bgs, dieldrin was detected in two of the samples from Field 3 at concentrations below the PRG. Dieldrin was not detected at 3 feet bgs in the other locations analyzed in Field 3 or, in Field 1 and Field 7. 4,4'-DDT and 4-4'-DDE were also detected in samples from Fields 3 and 7 at 3 feet bgs, but at concentrations well below the PRG. Diquat was detected in 8 of the 12 fields. A summary of the results is presented in Table 6 and shown on Figure 4.

Although dieldrin exceeded the PRG in three localized areas in shallow soil, the 95% upper confidence level (UCL) of the mean dieldrin concentration in shallow soil for the site was below the PRG of 30 ug/kg (Table 5). With the exception of Field 1, the mean concentration

⁵ USEPA Region IX PRGs were used for screening purposes only. The PRGs used for comparison are for residential soil from: October 1, 2002, *USEPA Region 9 Preliminary Remediation Goals (PRGs)*.

⁶ These samples were analyzed because preliminary laboratory showed detection limits above the PRGs.

of dieldrin in shallow soil in each individual field is also below the PRG. However, the mean concentration of dieldrin in Field 1, which is where the maximum dieldrin concentration (240 ug/kg) is located, exceeds the PRG. There were three other samples collected from shallow soil in Field 1 and analyzed for dieldrin. Dieldrin was not detected in two of these samples and was detected at 11 ug/kg in the third sample. However, because the dieldrin concentration in the sample collected at F1-C is well above the PRG, the mean dieldrin concentration in Field 1 exceeds the PRG.

For the inorganic compounds, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, cyanide, lead, mercury, nickel, vanadium, and zinc were detected in samples from 0.5 feet bgs. Except for beryllium, cyanide and mercury, these inorganics were detected in all samples. This is expected since these compounds are naturally-occurring constituents of soil. Soil pH was also within the normal range for soil, i.e. between 6 and 8. Table 7 presents a comparison of the inorganic results from surface soil at the Site to typical background ranges in soil in California and the western US. This comparison shows that the concentrations of inorganics detected at the Site are within the typical background range for California/Western US.

Table 7 also presents background ranges for metals in soil in northern Santa Clara County and in the Bay Area. These background ranges were compiled in a report by Christina Scott from various environmental investigations done within a 2-mile radius in northern Santa Clara County (Scott, 1991) and in a report by Lawrence Berkeley National Laboratory (LBNL) in the San Francisco Bay Area (LBNL, 2002). The BAREC Site is located in southern Santa Clara County between 5 and 10 miles south of where samples for northern Santa Clara County were collected in the Scott study. As discussed in Section 3.3, the Site is underlain by Quaternary alluvium deposited by streams that merge near the center of the San Jose Alluvial Plain and flow north toward San Francisco Bay. The alluvium is composed of unconsolidated interbedded gravel, sand silt and clay and becomes progressively finer-grained northward toward the Bay. Based on this information, the alluvium in northern Santa Clara County may be finer-grained than in southern Santa Clara County suggesting that there may be some natural variations in the inorganic composition of soils between southern and northern Santa Clara County. A qualitative comparison between Site data and the northern Santa Clara County data indicates that arsenic concentrations at the Site are just outside the range of the northern Santa Clara County background values and the average arsenic concentration at the Site is higher (11 mg/kg) than the northern Santa Clara County value (2.9 mg/kg). In addition, the average lead concentration at the Site (23 mg/kg) is slightly above the northern Santa Clara County value (11.4 mg/kg). Copper and zinc average concentrations at the Site are about the same as the northern Santa Clara County value while

the average concentrations of beryllium, chromium, nickel and vanadium at the Site are below the northern Santa Clara County study values.

With respect to the LBNL study, a qualitative comparison between site data and the roughly 1400 samples analyzed in LBNL study indicates that arsenic concentrations range from 1.8 to 37 mg/kg at the site and up to 42 mg/kg in the LBNL study. The average arsenic concentration at the site is higher (11 mg/kg) than the LBNL average (5.5 mg/kg). With respect to other metals, the average lead concentration at the site (23 mg/kg) is above the LBNL value (7.0 mg/kg). Barium and zinc average concentrations at the site are about the same as the LBNL average values while the average concentrations of beryllium, chromium, copper, nickel, and vanadium at the site are below the LBNL average values.

Table 7 also presents the results of the one background sample, BG-A, collected below pavement at 0.75 bgs. As discussed in Section 2, this sample was taken outside of areas at the Site known to have pesticide use. DTSC Guidance suggests that 4 samples should be collected, if possible, to determine background concentrations; however, only one small area of the Site, which was outside of buildings, was identified where there was no known pesticide/chemical use. Since the area surrounding the Site is highly urbanized and previously used as agricultural land, there were also no offsite areas where representative background samples could be collected. As a result, comparison of the results to only one background sample is of limited statistical value. However, a qualitative comparison indicates that arsenic and lead were detected in many samples at concentrations above the concentrations detected at BG-A. Barium, however, was detected at concentrations below the concentration in BG-A. Except for arsenic, barium and lead, the other metals were detected at similar concentrations as BG-A.

Tables 8 and 9 present the sample results for the inorganics and arsenic, respectively. A comparison of the inorganic results with USEPA Region IX PRGs⁷ showed that arsenic exceeded the PRG for all samples including BG-A. No other inorganic compound exceeded the PRGs. As noted in the preamble to the PRG table, the PRG for arsenic in residential soils is 0.39 mg/kg. This value is typically below background concentrations in a local area (especially in California), and as such, USEPA Region IX has at times used the non-cancer PRG for arsenic of 22 mg/kg (USEPA, 2000). Additional discussion of the arsenic results is presented below.

⁷ USEPA Region IX PRGs were used for screening purposes only. The PRGs used for comparison are for residential soil from: October 1, 2002, *USEPA Region 9 Preliminary Remediation Goals (PRGs)*.

4.1.1 Arsenic Background

Figures 5 and 6 show the concentrations of arsenic in soil at 0.5 feet and 3 feet bgs, respectively. Since arsenic is naturally-occurring in soil, an arsenic background concentration needs to be defined to determine areas at the Site, which may have been impacted by arsenical pesticides. As discussed above, in the Scott study, the maximum arsenic concentration in background soil was 20 mg/kg; in the LBNL study, the proposed upper estimate of the background arsenic concentration was 24 mg/kg, and; USEPA Region IX has at times used the non-cancer PRG for arsenic of 22 mg/kg as a background value. In addition, a plot of the cumulative frequency of the shallow arsenic soil concentrations at the Site presented in Figure 7 shows an inflection point at 20 mg/kg for the Site. Based on these data, concentrations of arsenic above 20 mg/kg are considered to exceed background levels.

In addition, the arsenic background concentration and removal action objectives that were approved by DTSC for the residential⁸ portion of the Town and Country Village Shopping Center (T&CVSC) development at 360 Winchester Boulevard in San Jose, (which is in close proximity to the BAREC Site), were also considered in development of an arsenic background concentration for the BAREC Site. The mean background concentration for arsenic at the T&CVSC was assumed to be 12 mg/kg. As a result, the residential removal action objectives for arsenic at the T&CVSC used a site-wide average concentration of 12 mg/kg and a maximum arsenic concentration of 20 mg/kg.

Table 10 presents summary statistics for arsenic in shallow and deeper soil at the Site. Assuming the arsenic concentrations that are above 20 mg/kg are replaced with a concentration of 7 mg/kg, which is the average concentration in deep soils, the average, standard deviation and 95% UCL of the mean arsenic concentration in shallow soil becomes of similar magnitude to deeper soil. Furthermore, if the arsenic concentrations at/above 20 mg/kg are removed, then the average arsenic concentration at the BAREC Site is less than 12 mg/kg, which is the mean background concentration for arsenic that was used at the nearby T&CVSC site.

4.1.2 Nature and Extent of Arsenic in Soil Above Background Levels

Elevated concentrations of arsenic above 20 mg/kg are located primarily in the eastern portion of Field 4, primarily at 0.5 feet bgs, in sample 1-GB collected from distressed vegetation next to the old screen house, and in sample F12-A in the dirt road between Fields 11 and 12 at 0.5 feet bgs. Sample F12-A, which has an arsenic concentration above 20

⁸ Unrestricted residential land use.

mg/kg, between Fields 11 and 12, however, appears to be of limited horizontal and vertical extent. Adjacent samples in Field 11 and 12 have arsenic concentrations of 10 and 5.3 mg/kg, respectively, and the sample at 3 feet bgs at F12-A has an arsenic concentration of 7.7 mg/kg. Sample 1-GB was collected from an obviously brown patch of grass in April 2003. The brown patch of grass was less than 2 feet in diameter surrounded by dark green grass.

With respect to the elevated concentrations of arsenic in Field 4, there are several samples in the southern half of Field 4 with arsenic above 20 mg/kg. At 0.5 feet depth, 6 samples exceeded 20 mg/kg at the following locations: F4-6, F4-A, F4-B, F4-C, F4-D, and F4-F; at 2 feet bgs, one sample exceeded 20 mg/kg at F4-7; and, at 3 feet bgs, two samples exceeded 20 mg/kg at the following locations: F4-7 and F4-C. Arsenic concentrations above 20 mg/kg are of limited vertical extent. All samples at 4 feet bgs collected from direct-push borings at F4-E/SB-1, F4-C/SB-2, and F4-F/SB-3 (near F4-7) had arsenic concentrations of 1.8, 7.7, and 2.6 mg/kg.

Table 10 provides a statistical summary of the arsenic results, and Figures 7 and 8 present histograms of arsenic concentrations in shallow (0.5 feet bgs) and deep soil (between 2 and 4 feet bgs). The table shows that the average and 95% UCL of the mean arsenic concentration is higher in shallow soil than in deeper soil. The histograms in Figures 7 and 8 also show a different distribution of arsenic concentrations between shallow and deep soil. Possible explanations for the different distribution are as follows:

- *Shallow soil may have been impacted by use of arsenical pesticides.* Pesticide use summary reports indicate that arsenical pesticides were used in 1979 through 1981 and 1983 through 1985; thus, it is possible that shallow soils in a portion of the Site, primarily the eastern half of Field 4, have been impacted by former use of arsenical pesticides at the BAREC;
- *Soil type/lithology likely changes with increasing depth at the Site and the concentrations of naturally-occurring constituents also change with depth.* As the soil type/lithology changes so does the concentrations of naturally-occurring constituents such as arsenic. For example, the sample, which was analyzed from 10 feet bgs⁹ near the former sewer leach pit, had an arsenic concentration of 1.2 mg/kg, which is below the minimum value detected in shallow soil. Other metals also had different concentrations in this leach pit sample in comparison to those detected in shallow soils. (Leach pit sampling results are discussed in more detail below in

⁹ The sample at 7 feet bgs was not considered because it was likely non-native material that was used to fill the leach pit when it was abandoned.

Section 4.2). Zinc, for example, had a higher concentration (120 mg/kg) in the leach pit sample than in shallow soil (between 44 and 99 mg/kg) while barium, cadmium, lead and nickel had concentrations that were higher in shallow soil compared to the leach pit sample concentration. In addition, a histogram of arsenic concentrations in deeper soil presented in Figure 8 shows a different distribution of arsenic in deeper soil. This different distribution suggests that deeper soils have a different composition of inorganics than shallow soils even accounting for the fact that some shallow soils have been impacted by arsenic.

4.2 LEACH PIT RESULTS

VOCs, SVOCs, organochlorine pesticides and TPH were not detected in soil samples collected from the bottom and 3 feet below the former sewer leach pit. Metals were detected at low concentrations in both samples. In the sample collected from the bottom of the former leach pit (at 7 feet bgs), only barium, chromium, copper, nickel, vanadium and zinc were detected and their detected concentrations were below the PRGs. This sample, however, was likely from non-native material (i.e. sand) that was used to fill the leach pit when it was abandoned. The same metals were also detected in the sample from 3 feet below the bottom of the former leach pit (or 10 feet bgs) along with arsenic, cadmium, cobalt, lead and mercury. Except for arsenic, the detected concentrations of these metals were below the PRGs. Arsenic was below the non-cancer PRG of 22 mg/kg but above the cancer PRG of 0.39 mg/kg for residential soils

The concentrations of metals detected from the leach pit samples were well within background ranges for California/Western U.S. soils. Arsenic was the only metal detected above PRGs at a concentration of 1.2 mg/kg. As discussed, the metals results for the leach pit samples are different than the concentrations in samples from the fields likely because a different soil horizon was sampled. Table 11 summarizes the sample results. Based on the sampling results, there is no evidence that the former sewer leach pit impacted subsurface soil and/or ground water at the Site.

4.3 SEDIMENT TRAP AND EVAPORATION POND RESULTS

In the center of the former evaporation pond, the soil samples, which were collected from depths of 2, 3.5, 6.5 and 7.8 feet bgs had arsenic concentrations of 20, 9.7, 2.8, and 2.9 mg/kg respectively. Soil samples collected at depths of 3.5 and 8.5 feet bgs from a soil boring adjacent to the sediment trap had arsenic concentrations of 3.5 and 3.2. Arsenic in these samples was below the non-cancer PRG of 22 mg/kg but above the cancer PRG of 0.39 mg/kg for residential soils. Sample results are presented in Table 9.

Organochlorine pesticides were not detected in a sample of the liquid inside the sediment trap (Table 6). Metals were detected at low concentrations in a sample of the sediment trap liquid (Table 8).

Based on the sampling results and consistent with Dames and Moore's conclusion regarding closure of the evaporation pond, there is no evidence that the former evaporation pond and adjacent sediment trap impacted subsurface soil and/or ground water at the Site.

5.0 RECOMMENDATIONS

Based on the sampling data collected to date, there is no evidence that pesticide use in fields at the Site impacted soil at depths below 4 feet.

There is evidence that shallow soils have been impacted by prior pesticide use. Dieldrin exceeded PRGs in shallow soil in isolated locations of the Site. Specifically, the mean dieldrin concentration in Field 1 exceeded the PRG primarily because of an isolated detection of dieldrin at a concentration of 240 ug/kg in surface soil. As a result, it is recommended that this "hot spot" of dieldrin be addressed such that the mean concentration in Field 1 will be below the PRG of 30 ug/kg.

Arsenic also exceeded background concentrations in portions of the Site. Surface soils in the eastern portion of Field 4 and at two isolated locations have arsenic concentrations above background. It is recommended that a removal action workplan (RAW) be prepared to address the elevated arsenic and dieldrin concentrations in shallow soils at these locations.

6.0 REFERENCES

- Agency for Toxic Substances and Disease Registry (ATSDR). .Toxicological profile for 1,3-Dichloropropene. U.S Department of Health and Human Services. February 1991.
- Dames & Moore, Report of Closure: Former Evaporation Bed Deciduous Fruit Field Station, Santa Clara California, Job No. 234-193-43, April 8, 1988.
- California Environmental Protection Agency – Department of Toxics Substances Control (DTSC), Interim Guidance for Sampling Agricultural Soils for School Sites (Second Revision), August 26, 2002.
- EXTOXNET (Extension Toxicology Network Pesticide Information Profiles, <http://ace.orst.edu/info/extoxnet/pips/ghindex.html>)
- Lawrence Berkeley National Laboratory 2002. *Analysis of Background Distributions of Metals in Soil at Lawrence Berkeley National Laboratory*. June.
- Scott, Christina. 1991. *Background Metal Concentrations in Soils in Northern Santa Clara County California*. University of San Francisco, Masters Thesis
- University of California (UC), Letter from David Towle, September 30, 2002.
- UC, Interviews with Dr. Zak Mousli, Superintendent for the Bay Area Research and Extension Center by ENVIRON, July/August 2002.
- USDA Agricultural Research Service Pesticide Properties Database: ARS (<http://www.arsusda.gov/rsml/ppdb1.html>).
- U.S. Department of Commerce, *National Climatic Atlas of the United States*, 1983.
- U.S. Environmental Protection Agency (USEPA), *USEPA Region 9 Preliminary Remediation Goals (PRGs)*. November 1, 2000.
- Other sources of information used in this report are:

- Documents and reports provided to ENVIRON by Dr. Mousli and David Towle of the Administrative Office for the Research & Extension Centers of the University of

California (UC) including: underground tank removal documents, an asbestos survey report, irrigation well documents, business plan documents, a chemical inventory, a pesticide list and restricted materials permit, septic system documents, a pesticide use summary monthly report from 1979 to 2002, and a business plan and chemical inventory.

- A review of historical aerial photographs for the Site and surrounding area dated 1937, 1954, 1958, 1960, 1963, 1966, 1968, 1971, 1974, 1976, 1978, 1980, 1982, 1984, 1988, 1989, 1990, 1992, 1994, 1996, 1997 and 1999 conducted at Pacific Aerial Surveys, Oakland, California on July 26, 2002.
- A review of regulatory agency databases for the Site and vicinity conducted by Environmental Data Resources, Inc. (EDR) and reported to ENVIRON on July 18, 2002. EDR conducted searches of federal databases including: United States Environmental Protection Agency (EPA) National Priorities List; EPA Comprehensive Environmental Response, Compensation, and Liability Information System; EPA Emergency Response Notification System; Corrective Action Report; and Resource Conservation and Recovery Information System; Flood Zone Data from the Federal Emergency Management Agency (FEMA). State databases included: Notify 65, which lists Proposition 65 records; California Environmental Protection Agency's Annual Workplan, which identifies known hazardous substance sites targeted for cleanup; Leaking Underground Storage Tank Information System; Underground Storage Tank Database; and Former Manufactured Gas (Coal Gas) Sites. In reviewing the environmental databases, it should be noted that such databases are not instantaneously updated by the specific regulatory agencies. Depending on the database and the agency, update frequency may be as infrequent as annually.
- A review of historic City Directory information for the Site and neighboring properties obtained from EDR.
- A review of a 1966 historic Sanborn Fire Insurance Map for the Site and neighboring properties obtained from EDR. Since the map showed only a small portion of the Site, ENVIRON requested but has not yet received a more complete map.
- A review of the United States Geological Survey (USGS) San Jose West, California 7.5-minute series topographical map, dated 1961, photorevised 1980.

- A review of historical United States Geological Survey (USGS) topographical maps, dating 1895, 1899, 1939, 1953, and 1961, with photo revisions from 1968 and 1978.
- A review of available Site files at the City of Santa Clara Fire Department on August 9, 2002.
- A review of available files for two properties in the vicinity of the Site (690 and 780 North Winchester Boulevard) at the City of San Jose Fire Department on August 9, 2002.
- A review of available files for the Site and property located at 690 North Winchester Boulevard at the San Francisco Bay Area Regional Water Quality Control Board on September 3, 2002.

TABLES

Table 1
Summary of Soil Chemical Test Results – July 1987 Soil Samples

	Detection Limit (mg/kg)	Bed Soil (0-1 ft) (mg/kg)
Toxaphene	1.6	*
Guthion	10	16
Baygon	0.01	0.028
Chloropropham	0.005	0.04
Fluometuron	0.001	1.6
2,4-D	0.025	1.2
Afugan	(1)	0.089
2-(Phenylazo)-Benzoic Acid	(1)	2.5
Zytron	(1)	0.17
Arsenic	40	78
Copper	3	27
Calcium	10	28,800

* Not detected

(1) Detection Limit not available - constituent concentration estimated from library search

Source: Dames & Moore Report (1988), Table D-4

Table 2

Summary of Soil Chemical Test Results – October 1987 Soil Samples

	Detection Limit (mg/kg)	<u>Background</u>		<u>Beneath the Evaporation Bed</u>			
		DFFS-1A (mg/kg)	DFFS-2A (mg/kg)	DFFS-3A (mg/kg)	DFFS-4A (mg/kg)	DFFS-5A (mg/kg)	DFFS-6A (mg/kg)
DDE	0.016	0.023	0.17	*	*	*	*
DDT	0.016	0.016	0.17	*	*	*	*
Organophosphate Pesticides	0.1-2.0	*	*	*	*	*	*
Chloropropham	0.5	*	*	2.8	*	*	*
Triazine Herbicides	0.1	*	*	*	*	*	*
Chlorinated Herbicides	0.025-0.13	*	*	*	*	*	*
Other Organic Compounds	-	*	*	*	*	*	*
Arsenic	40	*	*	*	*	*	*
Copper	3	24	29	22	22	18	20
Barium	10	120	120	110	120	110	110
Cadmium	0.5	0.66	0.59	0.52	0.54	*	0.63
Chromium	1	42	34	34	37	35	47
Cobalt	3	9.4	8.4	8	9.1	8.2	10
Lead	5	*	27	*	*	*	*
Nickel	5	52	49	48	51	43	49
Vanadium	5	31	28	27	29	29	31
Zinc	2	51	56	44	48	41	45

- Not available

* Not detected

Source: Dames & Moore Report (1988), Table D-6

Table 3
Chemicals of Potential Concern (COPCs) in Soil

Chemical Name	Years of Use at Site
<i>Organochlorine Pesticides - EPA Method 8081</i>	
Aldrin	No Record of Use
Dieldrin	No Record of Use
Endrin aldehyde	No Record of Use
Endrin	No Record of Use
Endrin ketone	No Record of Use
Heptachlor	No Record of Use
Heptachlor epoxide	No Record of Use
4,4'-DDD	No Record of Use
4,4'-DDE	No Record of Use
4,4'-DDT	No Record of Use
Endosulfan I	No Record of Use
Endosulfan II	No Record of Use
HCH (alpha) or alpha-BHC	No Record of Use
HCH (beta) or beta-BHC	No Record of Use
delta-BHC	No Record of Use
HCH (gamma), Lindane, or gamma-BHC	No Record of Use
Endosulfan sulfate	No Record of Use
4,4'-Methoxychlor	No Record of Use
Toxaphene	No Record of Use
Chlordane (Technical)	No Record of Use
alpha-Chlordane	No Record of Use
gamma-Chlordane	No Record of Use
<i>Organophosphorus Pesticides - EPA Method 8140</i>	
Acephate (Orthene) (By EPA 1657)	1980, 1984, 1989-1991, 1994
Atrazine	1986, 1988, 1990-2002
Azinphos methyl	No Record of Use
Carbophenothion	No Record of Use
Chlorpyrifos	1998
Diazinon	1984, 1985, 1987, 1990-1993, 1995
Dimethoate	No Record of Use
Disulfoton (Disyston)	No Record of Use
Ethion	No Record of Use
Fenthion	No Record of Use
Malathion	1988, 1990, 1991, 1993-1995
Mevinphos	No Record of Use
Ethyl parathion	No Record of Use
Methyl parathion	No Record of Use
Phorate	No Record of Use
Prometon	No Record of Use
Prometryn	No Record of Use
Propazine	No Record of Use
Simazine	No Record of Use

Table 3
Chemicals of Potential Concern (COPCs) in Soil

Chemical Name	Years of Use at Site
<i>Carbamate and Urea Pesticides - EPA Method 632</i>	
Bromacil	No Record of Use
Carbofuran (Furadan)	No Record of Use
Carbaryl (Sevin)	2002
Chlorpropham	No Record of Use
Diuron	No Record of Use
Fluometuron	No Record of Use
Linuron	1998
Methiocarb	No Record of Use
Methomyl	No Record of Use
Monuron	No Record of Use
Neburon	No Record of Use
Oxamyl	No Record of Use
Propham	No Record of Use
Propoxur	No Record of Use
<i>Triazine Herbicides - EPA Method 8141</i>	
Atraton	No Record of Use
Simazine	No Record of Use
Prometon	No Record of Use
Atrazine	No Record of Use
Propazine	No Record of Use
Simetryn	No Record of Use
Ametryn	No Record of Use
Prometryn	No Record of Use
Terbutryn	No Record of Use
<i>Chlorinated Herbicides - EPA Method 8151</i>	
2,4-Dichlorophenoxyacetic Acid (2,4-D)	1990, 1991, 1993-1999
2,4,5-Trichlorophenoxyacetic Acid (2,4,5-T)	No Record of Use
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	No Record of Use
2-Methyl-4-chlorophenoxyacetic acid (MCPA)	No Record of Use
2-(2-Methyl-4-chlorophenoxy) propionic acid (MCPP)	1990, 1991, 1993-2000, 2002
Paraquat	1979-1981, 1999, 2000
Diquat	1984-1997

Table 3
Chemicals of Potential Concern (COPCs) in Soil

Chemical Name	Years of Use at Site
<i>Inorganics/Metals - Various EPA Methods</i>	
Arsenic	1979-1981, 1983-1985
Antimony	No Record of Use
Barium	No Record of Use
Beryllium	No Record of Use
Cadmium	No Record of Use
Total Chromium	No Record of Use
Cobalt	No Record of Use
Copper	1980, 1984-1987, 1998
Cyanide	No Record of Use
Lead	No Record of Use
Mercury	No Record of Use
Molybdenum	No Record of Use
Nickel	No Record of Use
Selenium	No Record of Use
Silver	No Record of Use
Thallium	No Record of Use
Vanadium	No Record of Use
Zinc	No Record of Use

Table 4
Samples and Analyses Performed

Boring Location	Sample Name	Soil Sample Depth (ft bgs)	Sample Type	Sample Date	Analysis Performed								
					Arsenic Only	Organo-chlorine Pesticides - EPA Method 8081	Organo-phosphorus Pesticides - EPA Method 8140	Carbamate Pesticides - EPA Method 632	Triazine Herbicides - EPA Method 8190 or 8141	Chlorinated Herbicides - EPA Method 8151	Paraquat and Diquat	CAM Metals - California Title 22 (Title 26) Protocol	Cyanide and pH
Field 1	020731-F1-A-0.5	0.5	Soil	7/31/2002		X	X	X	X			X	X
Field 1	020731-F1-A-3.0	3.0	Soil	7/31/2002	X								
Field 1	020731-F1-B-0.5	0.5	Soil	7/31/2002		X	X	X	X	X		X	X
Field 1	020731-F1-B-3.0	3.0	Soil	7/31/2002	X								
Field 1	020731-F1-C-0.5	0.5	Soil	7/31/2002		X	X	X	X	X		X	X
Field 1	020731-F1-C-3.0	3.0	Soil	7/31/2002	X	X							
Field 1	020731-F1-D-0.5	0.5	Soil	7/31/2002		X	X	X	X	X		X	X
Field 1	020731-F1-D-3.0	3.0	Soil	7/31/2002	X								
Field 1	020923-F1-CIB-0.5	0.5	Soil	9/23/2002							X		
Field 2	020731-F2-A-0.5	0.5	Soil	7/31/2002		X	X	X	X	X		X	X
Field 2	020731-F2-A-3.0	3.0	Soil	7/31/2002	X								
Field 2	020731-F2-B-0.5	0.5	Soil	7/31/2002		X	X	X	X	X		X	X
Field 2	020731-F2-B-3.0	3.0	Soil	7/31/2002	X								
Field 2	020731-F2-C-0.5	0.5	Soil	7/31/2002		X	X	X	X	X		X	X
Field 2	020731-F2-C-3.0	3.0	Soil	7/31/2002	X								
Field 2	020731-F2-D-0.5	0.5	Soil	7/31/2002		X		X	X	X		X	X
Field 2	020731-F2-D-3.0	3.0	Soil	7/31/2002	X								

Table 4
Samples and Analyses Performed

Boring Location	Sample Name	Soil Sample Depth (ft bgs)	Sample Type	Sample Date	Analysis Performed								
					Arsenic Only	Organo-chlorine Pesticides - EPA Method 8081	Organo-phosphorus Pesticides - EPA Method 8140	Carbamate Pesticides - EPA Method 632	Triazine Herbicides - EPA Method 8190 or 8141	Chlorinated Herbicides - EPA Method 8151	Paraquat and Diquat	CAM Metals - California Title 22 (Title 26) Protocol	Cyanide and pH
Field 2	020923-F2-GB-0.5	0.5	Soil	9/23/2002							X		
Field 3	020731-F3-A-0.5	0.5	Soil	7/31/2002		X	X	X	X	X		X	X
Field 3	020731-F3-A-3.0	3.0	Soil	7/31/2002	X	X							
Field 3	020731-F3-B-0.5	0.5	Soil	7/31/2002		X	X	X	X	X		X	X
Field 3	020731-F3-B-3.0	3.0	Soil	7/31/2002	X	X							
Field 3	020731-F3-C-0.5	0.5	Soil	7/31/2002		X	X	X	X	X		X	X
Field 3	020731-F3-C-3.0	3.0	Soil	7/31/2002	X								
Field 3	020731-F3-D-0.5	0.5	Soil	7/31/2002		X	X	X	X	X		X	X
Field 3	020731-F3-D-3.0	3.0	Soil	7/31/2002	X	X							
Field 3	020731-F3-E-0.5	0.5	Soil	7/31/2002		X	X	X	X	X		X	X
Field 3	020731-F3-E-3.0	3.0	Soil	7/31/2002	X	X							
Field 3	020731-F3-F-0.5	0.5	Soil	7/31/2002		X	X	X	X	X		X	X
Field 3	020731-F3-F-3.0	3.0	Soil	7/31/2002	X	X							
Field 3	020923-F3-GB-0.5	0.5	Soil	9/23/2002							X		
Field 4	020731-F4-A-0.5	0.5	Soil	8/1/2002		X	X	X	X	X		X	X
Field 4	020731-F4-A-3.0	3.0	Soil	8/1/2002	X								
Field 4	020731-F4-B-0.5	0.5	Soil	7/31/2002		X	X	X	X	X		X	X
Field 4	020731-F4-B-3.0	3.0	Soil	7/31/2002	X								
Field 4	020731-F4-C-0.5	0.5	Soil	7/31/2002		X	X	X	X	X		X	X
Field 4	020731-F4-C-3.0	3.0	Soil	7/31/2002	X								
Field 4	020731-F4-D-0.5	0.5	Soil	7/31/2002		X	X	X	X	X		X	X
Field 4	020731-F4-D-3.0	3.0	Soil	7/31/2002	X								

Table 4
Samples and Analyses Performed

Boring Location	Sample Name	Soil Sample Depth (ft bgs)	Sample Type	Sample Date	Analysis Performed								
					Arsenic Only	Organo-chlorine Pesticides - EPA Method 8081	Organo-phosphorus Pesticides - EPA Method 8140	Carbamate Pesticides - EPA Method 632	Triazine Herbicides - EPA Method 8190 or 8141	Chlorinated Herbicides - EPA Method 8151	Paraquat and Diquat	CAM Metals - California Title 22 (Title 26) Protocol	Cyanide and pH
Field 4	020731-F4-E-0.5	0.5	Soil	8/1/2002		X	X	X	X			X	X
Field 4	020731-F4-E-3.0	3.0	Soil	8/1/2002	X								
Field 4	020731-F4-F-0.5	0.5	Soil	7/31/2002		X	X	X	X	X		X	X
Field 4	020731-F4-F-3.0	3.0	Soil	7/31/2002	X								
Field 4	020731-F4-G-0.5	0.5	Soil	7/31/2002		X	X	X	X	X		X	X
Field 4	020731-F4-G-3.0	3.0	Soil	7/31/2002	X								
Field 4	020731-F4-H-0.5	0.5	Soil	7/31/2002		X	X	X	X	X		X	X
Field 4	020731-F4-H-3.0	3.0	Soil	7/31/2002	X								
Field 4	020923-F4-HA-1-0.5	0.5	Soil	9/23/2002	X								
Field 4	020923-F4-HA-2-0.5	0.5	Soil	9/23/2002	X								
Field 4	020923-F4-HA-2-2.0	2.0	Soil	9/23/2002	X								
Field 4	020923-F4-HA-2-3.0	3.0	Soil	9/23/2002	X								
Field 4	020923-F4-HA-3-0.5	0.5	Soil	9/23/2002	X								
Field 4	020923-F4-HA-4-0.5	0.5	Soil	9/23/2002	X								
Field 4	020923-F4-HA-4-2.0	2.0	Soil	9/23/2002	X								
Field 4	020923-F4-HA-4-3.0	3.0	Soil	9/23/2002	X								
Field 4	020923-F4-HA-5-0.5	0.5	Soil	9/23/2002	X								
Field 4	020923-F4-HA-5-2.0	2.0	Soil	9/23/2002	X								
Field 4	020923-F4-HA-5-3.0	3.0	Soil	9/23/2002	X								
Field 4	020923-F4-HA-6-0.5	0.5	Soil	9/23/2002	X								
Field 4	020923-F4-HA-6-2.0	2.0	Soil	9/23/2002	X								
Field 4	020923-F4-HA-6-3.0	3.0	Soil	9/23/2002	X								

Table 4
Samples and Analyses Performed

Boring Location	Sample Name	Soil Sample Depth (ft bgs)	Sample Type	Sample Date	Analysis Performed									
					Arsenic Only	Organo-chlorine Pesticides - EPA Method 8081	Organo-phosphorus Pesticides - EPA Method 8140	Carbamate Pesticides - EPA Method 632	Triazine Herbicides - EPA Method 8190 or 8141	Chlorinated Herbicides - EPA Method 8151	Paraquat and Diquat	CAM Metals - California Title 22 (Title 26) Protocol	Cyanide and pH	
Field 4	020923-F4-HA-7-0.5	0.5	Soil	9/23/2002	X									
Field 4	020923-F4-HA-7-2.0	2.0	Soil	9/23/2002	X									
Field 4	020923-F4-HA-7-3.0	3.0	Soil	9/23/2002	X									
Field 4	020923-F4-HA-8-0.5	0.5	Soil	9/23/2002	X									
Field 4	020923-F4-HA-8-2.0	2.0	Soil	9/23/2002	X									
Field 4	020923-F4-HA-8-3.0	3.0	Soil	9/23/2002	X									
Field 4	020923-F4-HA-9-0.5	0.5	Soil	9/23/2002	X									
Field 4	020923-F4-HA-10-0.5	0.5	Soil	9/23/2002	X									
Field 4	020923-F4-HA-12-0.5	0.5	Soil	9/23/2002	X									
Field 4	020923-F4-HA-13-0.5	0.5	Soil	9/23/2002	X	X								
Field 4	020923-F4-HA-15-0.5	0.5	Soil	9/23/2002	X	X								
Field 4	020923-F4-HA-17-0.5	0.5	Soil	9/23/2002	X	X								
Field 4	020923-F4-HA-19-0.5	0.5	Soil	9/23/2002	X									
Field 4	020923-F4-SB-1-4.0	4.0	Soil	9/23/2002	X									
Field 4	020923-F4-SB-2-4.0	4.0	Soil	9/23/2002	X									
Field 4	020923-F4-SB-3-4.0	4.0	Soil	9/23/2002	X									
Field 5	020731-F5-A-0.5	0.5	Soil	8/1/2002		X	X	X	X	X		X	X	
Field 5	020731-F5-A-3.0	3.0	Soil	8/1/2002	X									
Field 5	020731-F5-B-0.5	0.5	Soil	8/1/2002		X	X	X	X	X		X	X	
Field 5	020731-F5-B-3.0	3.0	Soil	8/1/2002	X									
Field 5	020731-F5-C-0.5	0.5	Soil	8/1/2002		X	X	X	X	X		X	X	
Field 5	020731-F5-C-3.0	3.0	Soil	8/1/2002	X									
Field 5	020731-F5-D-0.5	0.5	Soil	8/1/2002		X	X	X	X	X		X	X	

Table 4
Samples and Analyses Performed

Boring Location	Sample Name	Soil Sample Depth (ft bgs)	Sample Type	Sample Date	Analysis Performed								
					Arsenic Only	Organo-chlorine Pesticides - EPA Method 8081	Organo-phosphorus Pesticides - EPA Method 8140	Carbamate Pesticides - EPA Method 632	Triazine Herbicides - EPA Method 8190 or 8141	Chlorinated Herbicides - EPA Method 8151	Paraquat and Diquat	CAM Metals - California Title 22 (Title 26) Protocol	Cyanide and pH
Field 5	020731-F5-D-3.0	3.0	Soil	8/1/2002	X								
Field 5	020923-F5-GB-0.5	0.5	Soil	9/23/2002							X		
Field 6	020731-F6-A-0.5	0.5	Soil	8/1/2002		X	X	X	X	X		X	X
Field 6	020731-F6-A-3.0	3.0	Soil	8/1/2002	X								
Field 6	020731-F6-B-0.5	0.5	Soil	8/1/2002		X	X	X	X	X		X	X
Field 6	020731-F6-B-3.0	3.0	Soil	8/1/2002	X								
Field 6	020731-F6-C-0.5	0.5	Soil	8/1/2002		X	X	X	X	X		X	X
Field 6	020731-F6-C-3.0	3.0	Soil	8/1/2002	X								
Field 6	020923-F6-GB-0.5	0.5	Soil	9/23/2002							X		
Field 7	020731-F7-A-0.5	0.5	Soil	7/31/2002		X	X	X	X	X		X	X
Field 7	020731-F7-A-3.0	3.0	Soil	7/31/2002	X								
Field 7	020731-F7-B-0.5	0.5	Soil	7/31/2002		X	X	X	X	X		X	X
Field 7	020731-F7-B-3.0	3.0	Soil	7/31/2002	X								
Field 7	020731-F7-C-0.5	0.5	Soil	7/31/2002		X	X	X	X	X		X	X
Field 7	020731-F7-C-3.0	3.0	Soil	7/31/2002	X								
Field 7	020731-F7-D-0.5	0.5	Soil	7/31/2002		X	X	X	X	X		X	X
Field 7	020731-F7-D-3.0	3.0	Soil	7/31/2002	X								
Field 7	020731-F7-E-0.5	0.5	Soil	7/31/2002		X	X	X	X	X		X	X
Field 7	020731-F7-E-3.0	3.0	Soil	7/31/2002	X								
Field 7	020731-F7-F-0.5	0.5	Soil	7/31/2002		X	X	X	X	X		X	X
Field 7	020731-F7-F-3.0	3.0	Soil	7/31/2002	X								
Field 7	020731-F7-F-0.5	0.5	Soil	7/31/2002		X	X	X	X	X		X	X
Field 7	020731-F7-F-3.0	3.0	Soil	7/31/2002	X								
Field 7	020731-F7-G-0.5	0.5	Soil	7/31/2002		X	X	X	X	X		X	X
Field 7	020731-F7-G-3.0	3.0	Soil	7/31/2002	X								
Field 7	020731-F7-G-3.0	3.0	Soil	7/31/2002	X	X							

Table 4
Samples and Analyses Performed

Boring Location	Sample Name	Soil Sample Depth (ft bgs)	Sample Type	Sample Date	Analysis Performed								
					Arsenic Only	Organo-chlorine Pesticides - EPA Method 8081	Organo-phosphorus Pesticides - EPA Method 8140	Carbamate Pesticides - EPA Method 632	Triazine Herbicides - EPA Method 8190 or 8141	Chlorinated Herbicides - EPA Method 8151	Paraquat and Diquat	CAM Metals - California Title 22 (Title 26) Protocol	Cyanide and pH
Field 7	020731-F7-H-0.5	0.5	Soil	7/31/2002		X	X	X	X			X	X
Field 7	020731-F7-H-3.0	3.0	Soil	7/31/2002	X								
Field 7	020923-F7-GB-0.5	0.5	Soil	9/23/2002							X		
Field 8	020731-F8-A-0.5	0.5	Soil	7/31/2002		X	X	X	X	X		X	X
Field 8	020731-F8-A-3.0	3.0	Soil	7/31/2002	X								
Field 8	020731-F8-B-0.5	0.5	Soil	7/31/2002		X	X	X	X	X		X	X
Field 8	020731-F8-B-3.0	3.0	Soil	7/31/2002	X								
Field 8	020731-F8-C-0.5	0.5	Soil	7/31/2002		X	X	X	X	X		X	X
Field 8	020731-F8-C-3.0	3.0	Soil	7/31/2002	X								
Field 8	020731-F8-D-0.5	0.5	Soil	7/31/2002		X	X	X	X	X		X	X
Field 8	020731-F8-D-3.0	3.0	Soil	7/31/2002	X								
Field 8	020923-F8-GB-0.5	0.5	Soil	9/23/2002							X		
Field 9	020731-F9-A-0.5	0.5	Soil	8/1/2002		X	X	X	X	X		X	X
Field 9	020731-F9-A-3.0	3.0	Soil	8/1/2002	X								
Field 9	020923-F9-GB-0.5	0.5	Soil	9/23/2002							X		

Table 4
Samples and Analyses Performed

Boring Location	Sample Name	Soil Sample Depth (ft bgs)	Sample Type	Sample Date	Analysis Performed								
					Arsenic Only	Organo-chlorine Pesticides - EPA Method 8081	Organo-phosphorus Pesticides - EPA Method 8140	Carbamate Pesticides - EPA Method 632	Triazine Herbicides - EPA Method 8190 or 8141	Chlorinated Herbicides - EPA Method 8151	Paraquat and Diquat	CAM Metals - California Title 22 (Title 26) Protocol	Cyanide and pH
Field 10	020731-F10-A-0.5	0.5	Soil	8/1/2002		X	X	X	X			X	X
Field 10	020731-F10-A-3.0	3.0	Soil	8/1/2002	X								
Field 10	020731-F10-B-0.5	0.5	Soil	8/1/2002		X	X	X	X	X		X	X
Field 10	020731-F10-B-3.0	3.0	Soil	8/1/2002	X								
Field 10	020923-F10-C1B-0.5	0.5	Soil	9/23/2002							X		
Field 11	020731-F11-A-0.5	0.5	Soil	8/1/2002		X	X	X	X	X		X	X
Field 11	020731-F11-A-3.0	3.0	Soil	8/1/2002	X								
Field 11	020731-F11-B-0.5	0.5	Soil	8/1/2002		X	X	X	X	X		X	X
Field 11	020731-F11-B-3.0	3.0	Soil	8/1/2002	X								
Field 11	020923-F11-C1B-0.5	0.5	Soil	9/23/2002							X		
Field 12	020731-F12-A-0.5	0.5	Soil	8/1/2002		X	X	X	X	X		X	X
Field 12	020731-F12-A-3.0	3.0	Soil	8/1/2002	X								
Field 12	020923-F12-HA-B-0.5	0.5	Soil	9/23/2002	X								
Greenhouse	020731-GH-A-0.5	0.5	Soil	8/1/2002		X	X	X	X	X		X	X
Greenhouse	020731-GH-A-3.0	3.0	Soil	8/1/2002	X								
Background	020731-BG-A-0.75	0.5	Soil	8/1/2002		X	X	X	X	X		X	X
Background	020731-BG-A-3.0	3.0	Soil	8/1/2002	X								
Sewer LeachPit	020923-ENV-1-7.0	5.5	Soil	9/23/2002		X						X	
Sewer LeachPit	020923-ENV-1-10.0	10.5	Soil	9/23/2002		X						X	
Decon Water	020801-DW-A	NA	Water	8/1/2002		X	X	X	X	X		X	X
Sediment Pit	030401-SEDPIT-1-W	NA	Water	4/1/2003		X						X	

Table 4
Samples and Analyses Performed

Boring Location	Sample Name	Soil Sample Depth (ft bgs)	Sample Type	Sample Date	Analysis Performed								Cyanide and pH
					Arsenic Only	Organo-chlorine Pesticides - EPA Method 8081	Organo-phosphorus Pesticides - EPA Method 8140	Carbamate Pesticides - EPA Method 632	Triazine Herbicides - EPA Method 8190 or 8141	Chlorinated Herbicides - EPA Method 8151	Paraquat and Diquat	CAM Metals - California Title 22 (Title 26) Protocol	
Sediment Pit	030401-ENV-2-3.5	3.5	Soil	4/1/2003	X								
Sediment Pit	030401-ENV-2-8.5	8.5	Soil	4/1/2003	X								
Sediment Pit	030401-ENV-3-2.0	2	Soil	4/1/2003	X								
Sediment Pit	030401-ENV-3-3.5	3.5	Soil	4/1/2003	X								
Sediment Pit	030401-ENV-3-6.5	6.5	Soil	4/1/2003	X								
Sediment Pit	030401-ENV-3-7.8	3.5	Soil	4/1/2003	X								
Grass	030401-GRASS-1-CB	3.5	Soil	4/1/2003		X						X	X (pH only)

Table 5
Statistical Summary of Detected Compounds in Soil Samples¹

Analyte	Number of Detections	Number of Samples	Minimum	Maximum ²	Average	Standard Deviation	95% Upper Confidence Level (UCL) of the Mean	Frequency of Detection	USEPA Region IX PRGs ³	
									Concentration (µg/kg)	
Pesticides										
Dieldrin	15	60	ND	240	12	31	19	25%	30	
Diquat	8	12	ND	7,500	3317	2,271	4,494	67%	130,000	
Endrin	6	60	ND	50	8.9	11	11	10%	18,000	
4,4'-DDT	40	60	ND	380	39	64	53	67%	1,700	
4,4'-DDE	40	60	ND	1,500	110	269	168	67%	1,700	
alpha-Chlordane	4	60	ND	50	8.3	10	11	7%	1,600	
gamma-Chlordane	4	60	ND	50	8.3	10	10	7%	1,600	
Heptachlor epoxide	1	60	ND	50	8	10	10	2%	53	
gamma-BHC (Lindane)	1	60	ND	94	9.1	15	12	2%	440	
Concentration (mg/kg)										
Metals										
Arsenic	136	136	ND	37	11.2	8.1	12	100%	0.39	
Barium	50	50	95	440	123	47	134	100%	5,400	
Beryllium	3	50	ND	0.52	0.27	0.062	0.28	6%	150	
Cadmium	50	50	1.7	3.6	2.8	0.33	2.9	100%	37	
Chromium	50	50	27	55	38	4.4	39	100%	210	
Cobalt	50	50	7.2	12	9.0	1.1	9.2	100%	900	
Copper	50	50	21	39	29	5.2	30	100%	3,100	
Cyanide	2	50	ND	0.32	0.18	0.047	0.19	4%	11	
Lead	50	50	1.2	63	22	12	26	100%	400	
Mercury	38	50	ND	0.28	0.074	0.054	0.087	76%	23	
Nickel	50	50	39	60	48	4.5	49	100%	150	
Vanadium	50	50	24	44	31	3.9	32	100%	550	
Zinc	50	50	44	99	63	12	66	100%	23,000	

Notes:

¹ Includes all data except: 020923-ENV-1-7.0, 020923-ENV-1-10.0, Rinseate (020801-DW-A) and Sediment trap liquid (030401-SEDPIT-1-W)

² Maximum detected concentration.

³ October 1, 2002, USEPA Region IX Preliminary Remediation Goals (PRGs) for residential soil

ND = not detected

Table 6
Summary of Investigation Results for Pesticides

Field	Sample Name	Soil Sample Depth (ft bgs) ^[1]	Sample Type	Sample Date	Soil Concentration (µg/kg) ^[2]						
					Organochlorine Pesticides						
					Dieldrin	Endrin	4,4'-DDT	4,4'-DDE	alpha-Chlordane	gamma-Chlordane	Diquat
USEPA Region 9 PRGs ^[6]					30	18,000	1,700	1,700	1,600	1,600	130,000
1	020731-F1-A-0.5	0.5	Soil	7/31/2002	<10	12	46	120	<10	<10	NA
1	020731-F1-B-0.5	0.5	Soil	7/31/2002	<10	<10	27	50	<10	<10	NA
1	020731-F1-C-0.5	0.5	Soil	7/31/2002	240	11	54	34	<10	<10	NA
1	020731-F1-C-3.0	3.0	Soil	7/31/2002	<10	<10	<10	<10	<10	<10	NA
1	020731-F1-D-0.5	0.5	Soil	7/31/2002	11	12	62	190	<10	<10	NA
1	020923-F1-GB-0.5	0.5	Soil	9/23/2002	NA	NA	NA	NA	NA	NA	3,100
2	020731-F2-A-0.5	0.5	Soil	7/31/2002	<10	12	46	94	<10	<10	NA
2	020731-F2-B-0.5	0.5	Soil	7/31/2002	<10	<10	13	13	<10	<10	NA
2	020731-F2-C-0.5	0.5	Soil	7/31/2002	<10	<10	17	16	<10	<10	NA
2	020731-F2-D-0.5	0.5	Soil	7/31/2002	<10	<10	20	19	<10	<10	NA
2	020923-F2-GB-0.5	0.5	Soil	9/23/2002	NA	NA	NA	NA	NA	NA	7,500
3	020731-F3-A-0.5	0.5	Soil	7/31/2002	42	<10	24	21	<10	<10	NA
3	020731-F3-A-3.0	3.0	Soil	7/31/2002	12	<10	<10	<10	<10	<10	NA
3	020731-F3-B-0.5	0.5	Soil	7/31/2002	37	<10	17	15	<10	<10	NA
3	020731-F3-B-3.0	3.0	Soil	7/31/2002	25	<10	<10	<10	<10	<10	NA
3	020731-F3-C-0.5	0.5	Soil	7/31/2002	17	<10	24	29	<10	<10	NA
3	020731-F3-D-0.5	0.5	Soil	7/31/2002	14	<100	200	1,100	<100	<100	NA
3	020731-F3-D-3.0	3.0	Soil	7/31/2002	<10	<10	<10	15	<10	<10	NA

Table 6
Summary of Investigation Results for Pesticides

Field	Sample Name	Soil Sample Depth (ft bgs) ^[1]	Sample Type	Sample Date	Soil Concentration (µg/kg) ^[2]						
					Organochlorine Pesticides						
					Dieldrin	Endrin	4,4'-DDT	4,4'-DDE	alpha-Chlordane	gamma-Chlordane	Diquat
3	020731-F3-E-0.5	0.5	Soil	7/31/2002	30	18,000	1,700	1,700	1,600	1,600	130,000
3	020731-F3-E-3.0	3.0	Soil	7/31/2002	22	<100	380	1,500	<100	<100	NA
3	020731-F3-F-0.5	0.5	Soil	7/31/2002	<10	<10	<10	<10	<10	<10	NA
3	020731-F3-F-3.0	3.0	Soil	7/31/2002	12	<100	130	730	<100	<100	NA
3	020731-F3-F-3.0	3.0	Soil	7/31/2002	<10	<10	20	85	<10	<10	NA
3	020923-F3-G-B-0.5	0.5	Soil	9/23/2002	NA	NA	NA	NA	NA	NA	2,300
4	020801-F4-A-0.5	0.5	Soil	8/1/2002	<10	<10	<10	<10	<10	<10	NA
4	020731-F4-B-0.5	0.5	Soil	7/31/2002	13	<10	17	13	<10	<10	NA
4	020731-F4-C-0.5	0.5	Soil	7/31/2002	13	<10	15	12	15	13	NA
4	020731-F4-D-0.5	0.5	Soil	7/31/2002	<10	<10	14	12	14	12	NA
4	020801-F4-E-0.5	0.5	Soil	8/1/2002	<10	<10	<10	<10	<10	<10	NA
4	020731-F4-F-0.5	0.5	Soil	7/31/2002	<10	<10	16	17	15	13	NA
4	020731-F4-G-0.5	0.5	Soil	7/31/2002	<10	<10	16	19	<10	<10	NA
4	020731-F4-H-0.5	0.5	Soil	7/31/2002	<10	<10	18	23	<10	<10	NA
4	020923-F4-HA-13-0.5	0.5	Soil	9/23/2002	<10	<10	<10	14	<10	<10	NA
4	020923-F4-HA-15-0.5	0.5	Soil	9/23/2002	<10	<10	11	<10	<10	<10	NA
4	020923-F4-HA-17-0.5	0.5	Soil	9/23/2002	<10	<10	13	35	<10	<10	NA
4	020923-F4-HA-9-0.5	0.5	Soil	9/23/2002	NA	NA	NA	NA	NA	NA	3,800
5	020801-F5-A-0.5	0.5	Soil	8/1/2002	<10	<10	65	120	<10	<10	NA

Table 6
Summary of Investigation Results for Pesticides

Field	Sample Name	Soil Sample Depth (ft bgs) ^[1]	Sample Type	Sample Date	Soil Concentration (µg/kg) ^[2]									
					Organochlorine Pesticides									
					Dieldrin	Endrin	4,4'-DDT	4,4'-DDE	alpha-Chlordane	gamma-Chlordane	Diquat			
USEPA Region 9 PRGs ^[6]								30	18,000	1,700	1,700	1,600	1,600	130,000
5	020801-F5-B-0.5	0.5	Soil	8/1/2002	<10	<10	42	76	<10	<10	NA			
5	020801-F5-C-0.5	0.5	Soil	8/1/2002	<10	<10	<10	16	<10	<10	NA			
5	020801-F5-D-0.5	0.5	Soil	8/1/2002	<10	<10	18	51	<10	<10	NA			
5	020923-F5-GB-0.5	0.5	Soil	9/23/2002	NA	NA	NA	NA	NA	NA	4,200			
6	020801-F6-A-0.5	0.5	Soil	8/1/2002	<10	<10	19	49	<10	<10	NA			
6	020801-F6-B-0.5	0.5	Soil	8/1/2002	<10	<10	<10	<10	<10	<10	NA			
6	020801-F6-C-0.5	0.5	Soil	8/1/2002	<10	<10	<10	<10	<10	<10	NA			
6	020923-F6-GB-0.5	0.5	Soil	9/23/2002	NA	NA	NA	NA	NA	NA	3,700			
7	020731-F7-A-0.5	0.5	Soil	7/31/2002	<10	<10	13	<10	13	<10	NA			
7 ^[3]	020731-F7-B-0.5	0.5	Soil	7/31/2002	<10	<10	11	<10	<10	17	NA			
7	020731-F7-C-0.5	0.5	Soil	7/31/2002	<10	<10	24	13	<10	<10	NA			
7	020731-F7-D-0.5	0.5	Soil	7/31/2002	<10	<10	46	20	<10	<10	NA			
7	020731-F7-E-0.5	0.5	Soil	7/31/2002	<10	30	150	280	<10	<10	NA			
7	020731-F7-F-0.5	0.5	Soil	7/31/2002	<10	<10	110	100	<10	<10	NA			
7	020731-F7-G-0.5	0.5	Soil	7/31/2002	<10	<50	130	650	<50	<50	NA			
7	020731-F7-G-3.0	3.0	Soil	7/31/2002	<10	<10	13	73	<10	<10	NA			
7 ^[5]	020731-F7-H-0.5	0.5	Soil	7/31/2002	<20	<20	110	350	<20	<20	NA			
7	020923-F7-GB-0.5	0.5	Soil	9/23/2002	NA	NA	NA	NA	NA	NA	<2,000			

Table 6
Summary of Investigation Results for Pesticides

Field	Sample Name	Soil Sample Depth (ft bgs) ^[1]	Sample Type	Sample Date	Soil Concentration (µg/kg) ^[2]						
					Organochlorine Pesticides						
					Dieldrin	Endrin	4,4'-DDT	4,4'-DDE	alpha-Chlordane	gamma-Chlordane	Diquat
USEPA Region 9 PRGs ^[6]					30	18,000	1,700	1,700	1,600	1,600	130,000
8	020731-F8-A-0.5	0.5	Soil	7/31/2002	<10	<10	16	13	<10	<10	NA
8	020731-F8-B-0.5	0.5	Soil	7/31/2002	<10	<10	<10	<10	<10	<10	NA
8	020731-F8-C-0.5	0.5	Soil	7/31/2002	<10	<10	<10	<10	<10	<10	NA
8	020731-F8-D-0.5	0.5	Soil	7/31/2002	<10	<10	<10	<10	<10	<10	NA
8	020923-F8-GB-0.5	0.5	Soil	9/23/2002	NA	NA	NA	NA	NA	NA	4,000
9	020801-F9-A-0.5	0.5	Soil	8/1/2002	12	<10	69	38	<10	<10	NA
9	020923-F9-GB-0.5	0.5	Soil	9/23/2002	NA	NA	NA	NA	NA	NA	<2,000
10	020801-F10-A-0.5	0.5	Soil	8/1/2002	<10	<10	<10	<10	<10	<10	NA
10	020801-F10-B-0.5	0.5	Soil	8/1/2002	<10	<10	<10	<10	<10	<10	NA
10	020923-F10-GB-0.5	0.5	Soil	9/23/2002	NA	NA	NA	NA	NA	NA	7,200
11	020801-F11-A-0.5	0.5	Soil	8/1/2002	<10	<10	<10	<10	<10	<10	NA
11	020801-F11-B-0.5	0.5	Soil	8/1/2002	<10	<10	<10	<10	<10	<10	NA
11	020923-F11-GB-0.5	0.5	Soil	9/23/2002	NA	NA	NA	NA	NA	NA	<2,000
12	020801-F12-A-0.5	0.5	Soil	8/1/2002	<10	<10	<10	<10	<10	<10	NA
12	020923-F12-HA-B-0.5	0.5	Soil	9/23/2002	NA	NA	NA	NA	NA	NA	<2000
Greenhouse	020801-GH-A-0.5	0.5	Soil	8/1/2002	17	<10	48	190	<10	<10	NA
Background	020801-BG-A-0.75	0.75	Soil	8/1/2002	<10	<10	<10	<10	<10	<10	NA
Decon Water	020801-DW-A	NA	Water	8/1/2002	<0.16 ^[4]	<0.16 ^[4]	<0.16 ^[4]	<0.16 ^[4]	<0.16 ^[4]	<0.16 ^[4]	NA

Table 6
Summary of Investigation Results for Pesticides

Field	Sample Name	Soil Sample Depth (ft bgs) ^[1]	Sample Type	Sample Date	Soil Concentration (µg/kg) ^[2]						
					Organochlorine Pesticides						
					Dieldrin	Endrin	4,4'-DDT	4,4'-DDE	alpha-Chlordane	gamma-Chlordane	Diquat
USEPA Region 9 PRGs ^[6]											
Leach pit	020923-ENV-1-7.0	7.0	Soil	9/23/2002	30	18,000	1,700	1,700	1,600	1,600	130,000
Leach pit	020923-ENV-1-10.0	10.0	Soil	9/23/2002	<10	<10	<10	<10	<10	<10	NA
Grass	030401-GRASS-1-GB	0.5	Soil	4/1/2003	12	27	150	270	<10	<10	NA
Sediment Trap	030401-SEDPIT-1-W	NA	Water	4/1/2003	<0.06	<0.06	<0.60	<0.60	<0.60	<0.60	NA

Notes:

[1] ft bgs = feet below ground surface

[2] Organochlorine Pesticide compounds were analyzed by EPA Method 8081. Only detected compounds are summarized in the table.

Shading denotes exceedence of USEPA Region 9 PRGs. Detections are shown in **BOLD**.

[3] Heptachlor epoxide was detected at 14 µg/kg.

[4] Result is reported in µg/L.

[5] Gamma-BHC (Lindane) was detected at 94 µg/kg.

[6] USEPA Region 9 PRGs for residential soil. October 2002.

NA - Not Analyzed

Table 7
Comparison of Background Concentrations of Inorganics in Soil

Inorganic Chemical	BAREC Concentration at 0.5 feet bgs				BAREC Background Sample BG-A ¹ (mg/kg)	Background Concentration			Location/ Source
	Number of Samples	Minimum (mg/kg)	Maximum (mg/kg)	Average (mg/kg)		Number of Samples	Range (mg/kg)	Average (mg/kg)	
Arsenic	66	2.6	37	18	5.4	72	0.3 - 69	6.6	Western US/Drugun&Chiasson 1991
						50	0.6 - 11.0	3.5	California/Bradford et al. 1996
						108	ND - 20	2.9	Northern Santa Clara/Scott 1991
						1397	ND-42	5.5	Lawrence Berkeley National Laboratory/2002
Barium	50	95	440	123	440	75	150 - 1,500	687	Western US/Drugun&Chiasson 1991
						50	133 - 1,400	509	California/Bradford et al. 1996
						1397	ND-490	130	Lawrence Berkeley National Laboratory/2002
Beryllium	50	ND	0.52	0.27	ND	75	ND - 3.0	0.5	Western US/Drugun&Chiasson 1991
						50	0.25 - 2.70	1.3	California/Bradford et al. 1996
						158	ND - 3.2	0.9	Northern Santa Clara/Scott 1991
						1397	ND-1.2	0.42	Lawrence Berkeley National Laboratory/2002
Cadmium	50	1.7	3.6	2.8	2.4	24	0.01 - 22	3.5	Western US/Drugun&Chiasson 1991
						50	0.05 - 1.7	0.4	California/Bradford et al. 1996
						158	ND - 14	NC	Northern Santa Clara/Scott 1991
						1395	ND-7.5	NC	Lawrence Berkeley National Laboratory/2002
Chromium, total	50	27	55	38	55	75	10 - 1,500	118	Western US/Drugun&Chiasson 1991
						50	23 - 1,579	122	California/Bradford et al. 1996
						158	ND - 170	51	Northern Santa Clara/Scott 1991
						1403	ND-144	58	Lawrence Berkeley National Laboratory/2002
Cobalt	50	7.2	12	9	9.2	75	ND - 50	13	Western US/Drugun&Chiasson 1991
						50	2.7 - 46.9	15	California/Bradford et al. 1996
						1397	ND-29	14	Lawrence Berkeley National Laboratory/2002
Copper	50	21	39	29	31	75	5.0 - 300	49	Western US/Drugun&Chiasson 1991
						50	9.1 - 96.4	29	California/Bradford et al. 1996
						136	4.6 - 67	36	Northern Santa Clara/Scott 1991
						1400	ND-69	32	Lawrence Berkeley National Laboratory/2002
Lead	50	1.2	63	23	1.2	75	ND - 300	29	Western US/Drugun&Chiasson 1991
						50	12.4 - 97.1	24	California/Bradford et al. 1996
						158	ND - 54	11	Northern Santa Clara/Scott 1991
						1398	ND-84	7	Lawrence Berkeley National Laboratory/2002
Mercury	50	ND	0.28	0.07	0.15	73	0.01 - 1.5	0.15	Western US/Drugun&Chiasson 1991
						50	0.05 - 0.9	0.26	California/Bradford et al. 1996
						127	ND - 1.3	NC	Northern Santa Clara/Scott 1991
						1406	ND-2.2	NC	Lawrence Berkeley National Laboratory/2002
Nickel	50	39	60	48	44	75	<5.0 - 200	38	Western US/Drugun&Chiasson 1991
						50	9 - 509	57	California/Bradford et al. 1996
						136	6 - 145	74	Northern Santa Clara/Scott 1991
						1399	6 - 380	68	Lawrence Berkeley National Laboratory/2002
Vanadium	50	24	44	31	43	75	30 - 500	125	Western US/Drugun&Chiasson 1991
						50	39 - 288	112	California/Bradford et al. 1996
						1397	ND-120	46	Lawrence Berkeley National Laboratory/2002
Zinc	50	44	99	63	44	75	25 - 212	78	Western US/Drugun&Chiasson 1991
						50	88 - 236	149	California/Bradford et al. 1996
						136	7.8 - 120	65	Northern Santa Clara/Scott 1991
						1396	3.8 - 190	64	Lawrence Berkeley National Laboratory/2002

Table 7
Comparison of Background Concentrations of Inorganics in Soil

Inorganic Chemical	BAREC Concentration at 0.5 feet bgs			BAREC Background Sample BG-A ¹ (mg/kg)	Background Concentration			Location/ Source
	Number of Samples	Minimum (mg/kg)	Maximum (mg/kg)		Number of Samples	Range (mg/kg)	Average (mg/kg)	

Notes:

NC = Not Calculated. ND = Not Detected

1 Collected at 0.75 feet below ground surface (bgs).

Sources:

Bradford, G.R., A.C. Chang, A.L. Page, D. Bakhr, J.A. Frampton, and H. Wright. 1996. *Background Concentrations of Trace and Major Elements in California Soils*. Kearney Foundation Special Report. University of California, Division of Agriculture and Natural Resources, Kearney Foundation of Soil Science. March

Dragun, J., and A. Chiasson. 1991. *Elements in North American Soils*. Greenbelt, MD: Hazardous Materials Control Resources Institute.

Scott, Christina. 1991. *Background Metal Concentrations in Soils in Northern Santa Clara County California*. University of San Francisco, Masters Thesis

LBNL. 2002. *Analysis of Background Distributions of Metals in Soil at the Lawrence Berkeley National Laboratory (LBNL)*. University of California, Environmental Restoration Program. June

Table 8
Summary of Investigation Results for Inorganics and pH

Boring	F1-A	F1-B	F1-C	F1-D	F2-A	F2-B	F2-C
Sample Name	020731-F1-A-0.5	020731-F1-B-0.5	020731-F1-C-0.5	020731-F1-D-0.5	020731-F2-A-0.5	020731-F2-B-0.5	020731-F2-C-0.5
Soil Sample Depth (ft bgs) ^[1]	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Sample Date	7/31/2002	7/31/2002	7/31/2002	7/31/2002	7/31/2002	7/31/2002	7/31/2002
pH	6.6	6.6	7.0	7.0	7.1	7.3	7.2
Concentration (mg/kg) ^[2]							
Antimony	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Barium	120	120	120	120	120	140	140
Beryllium	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50
Cadmium	3.0	2.8	2.8	2.5	2.9	3.2	3.6
Chromium	41	38	40	34	36	41	48
Cobalt	9.4	8.8	8.5	7.8	8.9	10	11
Copper	38	31	23	24	27	30	39
Cyanide	<0.35	<0.40	<0.34	<0.35	<0.47	<0.42	<0.36
Lead	22	17	17	19	17	24	26
Molybdenum	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Nickel	51	48	47	43	49	52	58
Selenium	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Silver	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Thallium	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Vanadium	34	31	30	28	30	36	44
Zinc	57	51	53	54	64	67	72
Mercury	0.061	<0.050	<0.050	0.064	0.065	0.070	0.057

Notes:

[1] ft bgs = feet below ground surface

[2] Samples were analyzed for metals by EPA Methods 6010B or 7471A.

[3] Sample analyzed for metals by EPA Methods 6010B or 7470A.

Table 8
Summary of Investigation Results for Inorganics and pH

Boring	F2-D	F3-A	F3-B	F3-C	F3-D	F3-E	F3-F
Sample Name	020731-F2-D-0.5	020731-F3-A-0.5	020731-F3-B-0.5	020731-F3-C-0.5	020731-F3-D-0.5	020731-F3-E-0.5	020731-F3-F-0.5
Soil Sample Depth (ft bgs) ^[1]	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Sample Date	7/31/2002	7/31/2002	7/31/2002	7/31/2002	7/31/2002	7/31/2002	7/31/2002
pH	7.1	7.0	7.1	7.4	7.5	7.5	7.6
Concentration (mg/kg) ^[2]							
Antimony	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Barium	120	110	110	110	110	110	110
Beryllium	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Cadmium	3.2	2.8	2.9	2.8	2.7	2.6	2.6
Chromium	42	37	37	36	38	34	35
Cobalt	9.7	8.8	9.0	8.6	8.7	8.7	8.4
Copper	27	31	27	24	26	26	23
Cyanide	<0.34	<0.35	<0.40	<0.31	<0.27	<0.45	<0.18
Lead	18	18	13	12	26	28	20
Molybdenum	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Nickel	53	48	50	48	47	46	46
Selenium	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Silver	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Thallium	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Vanadium	35	30	30	28	29	28	27
Zinc	66	56	55	53	51	52	49
Mercury	<0.050	0.052	0.056	0.055	0.061	0.063	0.088

Notes:

[1] ft bgs = feet below ground surface

[2] Samples were analyzed for metals by EPA Methods 6010B or 7471A.

[3] Sample analyzed for metals by EPA Methods 6010B or 7470A.

Table 8
Summary of Investigation Results for Inorganics and pH

Boring	F4-A	F4-A	F4-B	F4-B	F4-C	F4-C	F4-D
Sample Name	020801-F4-A-0.5	020801-F4-A-3.0	020731-F4-B-0.5	020731-F4-B-3.0	020731-F4-C-0.5	020731-F4-C-3.0	020731-F4-D-0.5
Soil Sample Depth (ft bgs) ^[1]	0.5	3.0	0.5	3.0	0.5	3.0	0.5
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Sample Date	8/1/2002	8/1/2002	7/31/2002	7/31/2002	7/31/2002	7/31/2002	7/31/2002
pH	6.2	NA	6.7	NA	7.0	NA	6.8
Concentration (mg/kg) ^[2]							
Antimony	<2.0	NA	<2.0	NA	<2.0	NA	<2.0
Barium	110	NA	120	NA	130	NA	120
Beryllium	<0.50	NA	<0.50	NA	<0.50	NA	<0.50
Cadmium	2.6	NA	3.1	NA	3.2	NA	2.8
Chromium	35	NA	38	NA	40	NA	36
Cobalt	8.2	NA	9.6	NA	10	NA	8.4
Copper	33	NA	34	NA	36	NA	33
Cyanide	<0.32	NA	<0.33	NA	<0.36	NA	<0.27
Lead	48	NA	40	NA	34	NA	63
Molybdenum	<1.0	NA	<1.0	NA	<1.0	NA	<1.0
Nickel	44	NA	49	NA	52	NA	45
Selenium	<2.0	NA	<2.0	NA	<2.0	NA	<2.0
Silver	<1.0	NA	<1.0	NA	<1.0	NA	<1.0
Thallium	<1.0	NA	<1.0	NA	<1.0	NA	<1.0
Vanadium	29	NA	33	NA	34	NA	29
Zinc	90	NA	90	NA	81	NA	73
Mercury	0.052	NA	0.084	NA	0.056	NA	<0.050

Notes:

[1] ft bgs = feet below ground surface

[2] Samples were analyzed for metals by EPA Methods 6010B or 7471A.

[3] Sample analyzed for metals by EPA Methods 6010B or 7470A.

Table 8
Summary of Investigation Results for Inorganics and pH

Boring	F4-D	F4-E	F4-F	F4-F	F4-G	F4-H	F5-A
Sample Name	020731-F4-D-3.0	020801-F4-E-0.5	020731-F4-F-0.5	020731-F4-F-3.0	020731-F4-G-0.5	020731-F4-H-0.5	020801-F5-A-0.5
Soil Sample Depth (ft bgs) ^[1]	3.0	0.5	0.5	3.0	0.5	0.5	0.5
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Sample Date	7/31/2002	8/1/2002	7/31/2002	7/31/2002	7/31/2002	7/31/2002	8/1/2002
pH	NA	6.9	7.2	NA	6.4	7.1	7.7
Concentration (mg/kg) ^[2]							
Antimony	NA	<2.0	<2.0	NA	<2.0	<2.0	<2.0
Barium	NA	120	110	NA	110	98	120
Beryllium	NA	<0.50	<0.50	NA	<0.50	<0.50	<0.50
Cadmium	NA	2.7	2.9	NA	2.7	2.7	2.6
Chromium	NA	36	36	NA	32	35	37
Cobalt	NA	8.3	9.1	NA	8.2	8.3	8.7
Copper	NA	36	37	NA	34	35	28
Cyanide	NA	<0.43	<0.34	NA	<0.077	<0.30	<0.41
Lead	NA	43	43	NA	30	25	27
Molybdenum	NA	<1.0	<1.0	NA	<1.0	<1.0	<1.0
Nickel	NA	46	46	NA	41	43	47
Selenium	NA	<2.0	<2.0	NA	<2.0	<2.0	<2.0
Silver	NA	<1.0	<1.0	NA	<1.0	<1.0	<1.0
Thallium	NA	<1.0	<1.0	NA	<1.0	<1.0	<1.0
Vanadium	NA	30	31	NA	28	29	29
Zinc	NA	99	85	NA	70	68	63
Mercury	NA	0.059	0.064	NA	0.050	0.25	0.097

Notes:

[1] ft bgs = feet below ground surface

[2] Samples were analyzed for metals by EPA Methods 6010B or 7471A.

[3] Sample analyzed for metals by EPA Methods 6010B or 7470A.

Table 8
Summary of Investigation Results for Inorganics and pH

Boring	F5-B	F5-C	F5-D	F6-A	F6-B	F6-C	F7-A
Sample Name	020801-F5-B-0.5	020801-F5-C-0.5	020801-F5-D-0.5	020801-F6-A-0.5	020801-F6-B-0.5	020801-F6-C-0.5	020731-F7-A-0.5
Soil Sample Depth (ft bgs) ^[1]	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Sample Date	8/1/2002	8/1/2002	8/1/2002	8/1/2002	8/1/2002	8/1/2002	7/31/2002
pH	7.0	7.2	5.9	6.8	7.0	7.0	7.0
Concentration (mg/kg)^[2]							
Antimony	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Barium	120	110	110	120	130	110	110
Beryllium	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Cadmium	2.7	2.7	2.7	2.6	2.8	2.4	2.7
Chromium	36	38	38	34	38	33	39
Cobalt	8.7	9.0	9.1	8.6	9.6	7.9	8.7
Copper	27	24	26	30	27	22	23
Cyanide	<0.31	<0.24	<0.43	<0.41	<0.26	<0.43	0.30
Lead	24	18	21	32	19	17	15
Molybdenum	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Nickel	48	52	52	45	49	43	48
Selenium	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Silver	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Thallium	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Vanadium	29	31	30	28	31	26	29
Zinc	65	54	54	62	64	57	54
Mercury	0.079	<0.050	<0.050	0.28	0.15	0.071	<0.050

Notes:

[1] ft bgs = feet below ground surface

[2] Samples were analyzed for metals by EPA Methods 6010B or 7471A.

[3] Sample analyzed for metals by EPA Methods 6010B or 7470A.

Table 8
Summary of Investigation Results for Inorganics and pH

Boring	F7-B	F7-C	F7-D	F7-E	F7-F	F7-G	F7-H
Sample Name	020731-F7-B-0.5	020731-F7-C-0.5	020731-F7-D-0.5	020731-F7-E-0.5	020731-F7-F-0.5	020731-F7-G-0.5	020731-F7-H-0.5
Soil Sample Depth (ft bgs) ^[1]	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Sample Date	7/31/2002	7/31/2002	7/31/2002	7/31/2002	7/31/2002	7/31/2002	7/31/2002
pH	6.9	7.0	7.0	7.1	6.9	7.0	7.0
Concentration (mg/kg)^[2]							
Antimony	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Barium	100	110	110	130	120	140	140
Beryllium	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	0.52
Cadmium	2.7	2.7	2.7	3.3	3.0	3.5	3.5
Chromium	36	36	37	43	38	45	45
Cobalt	8.1	8.8	9.2	11	10	12	12
Copper	22	24	31	37	35	34	33
Cyanide	<0.26	<0.28	<0.29	<0.37	<0.26	0.32	<0.42
Lead	20	14	16	18	19	23	22
Molybdenum	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Nickel	46	45	48	57	52	59	60
Selenium	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Silver	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Thallium	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Vanadium	30	28	29	35	31	36	36
Zinc	53	56	68	67	79	69	72
Mercury	<0.050	0.070	0.087	0.072	0.11	0.089	0.099

Notes:

[1] ft bgs = feet below ground surface

[2] Samples were analyzed for metals by EPA Methods 6010B or 7471A.

[3] Sample analyzed for metals by EPA Methods 6010B or 7470A.

Table 8
Summary of Investigation Results for Inorganics and pH

Boring	F8-A	F8-B	F8-C	F8-D	F9-A	F10-A	F10-B
Sample Name	020731-F8-A-0.5	020731-F8-B-0.5	020731-F8-C-0.5	020731-F8-D-0.5	020801-F9-A-0.5	020801-F10-A-0.5	020801-F10-B-0.5
Soil Sample Depth (ft bgs) ^[1]	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Sample Date	7/31/2002	7/31/2002	7/31/2002	7/31/2002	8/1/2002	8/1/2002	8/1/2002
pH	6.8	7.0	7.3	7.1	7.1	6.9	7.2
Concentration (mg/kg) ^[2]							
Antimony	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Barium	120	120	100	110	130	99	95
Beryllium	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Cadmium	2.8	3.0	2.8	2.7	3.1	2.5	2.3
Chromium	39	42	35	38	43	35	36
Cobalt	9.5	9.8	7.9	9.0	11	7.6	7.3
Copper	28	25	21	21	28	24	21
Cyanide	<0.26	<0.27	<0.34	<0.36	<0.44	<0.35	<0.44
Lead	22	15	15	11	22	17	15
Molybdenum	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Nickel	47	51	43	47	51	47	43
Selenium	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Silver	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Thallium	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Vanadium	32	35	32	31	36	29	26
Zinc	56	54	56	50	60	64	57
Mercury	0.10	0.063	0.065	<0.050	<0.050	<0.050	<0.050

Notes:

[1] ft bgs = feet below ground surface

[2] Samples were analyzed for metals by EPA Methods 6010B or 7471A.

[3] Sample analyzed for metals by EPA Methods 6010B or 7470A.

Table 8
Summary of Investigation Results for Inorganics and pH

Boring	F11-A	F11-B	F12-A	F12-A	F12-A	GH-A	BG-A	I-GB
Sample Name	020801-F11-A-0.5	020801-F11-B-0.5	020801-F12-A-0.5	020801-F12-A-0.5	020801-F12-A-3.0	020801-GH-A-0.5	020801-BG-A-0.75	030401-GRASS-I-GB
Soil Sample Depth (ft bgs) ^[1]	0.5	0.5	0.5	0.5	3.0	0.5	0.75	0.5
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Sample Date	8/1/2002	8/1/2002	8/1/2002	8/1/2002	8/1/2002	8/1/2002	8/1/2002	4/1/2003
pH	7.2	7.0	7.2	7.2	NA	6.8	7.9	7.5
Concentration (mg/kg) ^[2]								
Antimony	<2.0	<2.0	<2.0	<2.0	NA	<2.0	<2.0	<2.0
Barium	110	110	110	110	NA	120	440	110
Beryllium	<0.50	<0.50	<0.50	<0.50	NA	<0.50	<0.50	<0.50
Cadmium	2.5	2.7	2.4	2.4	NA	2.6	2.4	1.7
Chromium	34	36	32	32	NA	36	55	27
Cobalt	8.2	8.4	7.9	7.9	NA	8.7	9.2	7.2
Copper	31	21	21	21	NA	30	31	29
Cyanide	<0.33	<0.31	<0.25	<0.25	NA	<0.38	<0.42	NA
Lead	27	20	23	23	NA	17	1.2	59
Molybdenum	<1.0	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<1.0
Nickel	44	49	43	43	NA	42	44	39
Selenium	<2.0	<2.0	<2.0	<2.0	NA	<2.0	<2.0	<2.0
Silver	<1.0	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<1.0
Thallium	<1.0	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<1.0
Vanadium	27	28	26	26	NA	28	43	24
Zinc	73	65	68	68	NA	59	44	63
Mercury	0.061	0.057	0.068	0.068	NA	0.13	0.15	0.21

Notes:

[1] ft bgs = feet below ground surface

[2] Samples were analyzed for metals by EPA Methods 6010B or 7471A.

[3] Sample analyzed for metals by EPA Methods 6010B or 7470A.

Table 9
Results of Arsenic Analyses

Boring	Sample Name	Soil Sample Depth (ft bgs) ^[1]	Arsenic Concentration (mg/kg)
Field 1			
F1-A	020731-F1-A-0.5	0.5	13
F1-A	020731-F1-A-3.0	3.0	3.5
F1-B	020731-F1-B-0.5	0.5	11
F1-B	020731-F1-B-3.0	3.0	2.8
F1-C	020731-F1-C-0.5	0.5	12
F1-C	020731-F1-C-3.0	3.0	2.7
F1-D	020731-F1-D-0.5	0.5	16
F1-D	020731-F1-D-3.0	3.0	3.6
Field 2			
F2-A	020731-F2-A-0.5	0.5	11
F2-A	020731-F2-A-3.0	3.0	4.7
F2-B	020731-F2-B-0.5	0.5	14
F2-B	020731-F2-B-3.0	3.0	5.7
F2-C	020731-F2-C-0.5	0.5	16
F2-C	020731-F2-C-3.0	3.0	2.3
F2-D	020731-F2-D-0.5	0.5	15
F2-D	020731-F2-D-3.0	3.0	5.1
Field 3			
F3-A	020731-F3-A-0.5	0.5	16
F3-A	020731-F3-A-3.0	3.0	6.6
F3-B	020731-F3-B-0.5	0.5	11
F3-B	020731-F3-B-3.0	3.0	3.8
F3-C	020731-F3-C-0.5	0.5	9.2
F3-C	020731-F3-C-3.0	3.0	2.4
F3-D	020731-F3-D-0.5	0.5	14
F3-D	020731-F3-D-3.0	3.0	3.0
F3-E	020731-F3-E-0.5	0.5	14
F3-E	020731-F3-E-3.0	3.0	2.8
F3-F	020731-F3-F-0.5	0.5	11
F3-F	020731-F3-F-3.0	3.0	4.8
Field 4			
F4-A	020801-F4-A-0.5	0.5	24
F4-A	020801-F4-A-3.0	3.0	8.6
F4-B	020731-F4-B-0.5	0.5	28
F4-B	020731-F4-B-3.0	3.0	6.2
F4-C	020731-F4-C-0.5	0.5	33
F4-C	020731-F4-C-3.0	3.0	29
F4-D	020731-F4-D-0.5	0.5	35
F4-D	020731-F4-D-3.0	3.0	5.3
F4-E	020801-F4-E-0.5	0.5	21
F4-E	020801-F4-E-3.0	3.0	19
F4-F	020731-F4-F-0.5	0.5	36
F4-F	020731-F4-F-3.0	3.0	18

Table 9
Results of Arsenic Analyses

Boring	Sample Name	Soil Sample Depth (ft bgs) ^[1]	Arsenic Concentration (mg/kg)
Field 4 continued			
F4-G	020731-F4-G-0.5	0.5	14
F4-G	020731-F4-G-3.0	3.0	14
F4-H	020731-F4-H-0.5	0.5	17
F4-H	020731-F4-H-3.0	3.0	8.2
F4-1	020923-F4-HA-1-0.5	0.5	19
F4-2	020923-F4-HA-2-0.5	0.5	20
F4-2	020923-F4-HA-2-2.0	2.0	5.1
F4-2	020923-F4-HA-2-3.0	3.0	8.9
F4-3	020923-F4-HA-3-0.5	0.5	17
F4-4	020923-F4-HA-4-0.5	0.5	19
F4-4	020923-F4-HA-4-2.0	2.0	3.1
F4-4	020923-F4-HA-4-3.0	3.0	2.9
F4-5	020923-F4-HA-5-0.5	0.5	20
F4-5	020923-F4-HA-5-2.0	2.0	9.0
F4-5	020923-F4-HA-5-3.0	3.0	3.5
F4-6	020923-F4-HA-6-0.5	0.5	26
F4-6	020923-F4-HA-6-2.0	2.0	10
F4-6	020923-F4-HA-6-3.0	3.0	6.8
F4-7	020923-F4-HA-7-0.5	0.5	21
F4-7	020923-F4-HA-7-2.0	2.0	26
F4-7	020923-F4-HA-7-3.0	3.0	24
F4-8	020923-F4-HA-8-0.5	0.5	20
F4-8	020923-F4-HA-8-2.0	2.0	9.4
F4-8	020923-F4-HA-8-3.0	3.0	2.7
F4-9	020923-F4-HA-9-0.5	0.5	16
F4-10	020923-F4-HA-10-0.5	0.5	15
F4-12	020923-F4-HA-12-0.5	0.5	15
F4-13	020923-F4-HA-13-0.5	0.5	19
F4-15	020923-F4-HA-15-0.5	0.5	16
F4-17	020923-F4-HA-17-0.5	0.5	17
F4-19	020923-F4-HA-19-0.5	0.5	2.6
SB-1	020923-F4-SB-1-4.0	4.0	1.8
SB-2	020923-F4-SB-2-4.0	4.0	7.7
SB-3	020923-F4-SB-3-4.0	4.0	2.6
Field 5			
F5-A	020801-F5-A-0.5	0.5	18
F5-A	020801-F5-A-3.0	3.0	5.1
F5-B	020801-F5-B-0.5	0.5	18
F5-B	020801-F5-B-3.0	3.0	3
F5-C	020801-F5-C-0.5	0.5	17
F5-C	020801-F5-C-3.0	3.0	16
F5-D	020801-F5-D-0.5	0.5	18
F5-D	020801-F5-D-3.0	3.0	13

Table 9
Results of Arsenic Analyses

Boring	Sample Name	Soil Sample Depth (ft bgs) ^[1]	Arsenic Concentration (mg/kg)
Field 6			
F6-A	020801-F6-A-0.5	0.5	19
F6-A	020801-F6-A-3.0	3.0	2.5
F6-B	020801-F6-B-0.5	0.5	15
F6-B	020801-F6-B-3.0	3.0	2.4
F6-C	020801-F6-C-0.5	0.5	19
F6-C	020801-F6-C-3.0	3.0	19
Field 7			
F7-A	020731-F7-A-0.5	0.5	10
F7-A	020731-F7-A-3.0	3.0	3.2
F7-B	020731-F7-B-0.5	0.5	7.8
F7-B	020731-F7-B-3.0	3.0	2.9
F7-C	020731-F7-C-0.5	0.5	12
F7-C	020731-F7-C-3.0	3.0	3.6
F7-D	020731-F7-D-0.5	0.5	18
F7-D	020731-F7-D-3.0	3.0	5.7
F7-E	020731-F7-E-0.5	0.5	15
F7-E	020731-F7-E-3.0	3.0	4.4
F7-F	020731-F7-F-0.5	0.5	20
F7-F	020731-F7-F-3.0	3.0	4.8
F7-G	020731-F7-G-0.5	0.5	17
F7-G	020731-F7-G-3.0	3.0	4.7
F7-H	020731-F7-H-0.5	0.5	17
F7-H	020731-F7-H-3.0	3.0	5.4
Field 8			
F8-A	020731-F8-A-0.5	0.5	12
F8-A	020731-F8-A-3.0	3.0	5.1
F8-B	020731-F8-B-0.5	0.5	12
F8-B	020731-F8-B-3.0	3.0	6.2
F8-C	020731-F8-C-0.5	0.5	7.4
F8-C	020731-F8-C-3.0	3.0	3.5
F8-D	020731-F8-D-0.5	0.5	6.5
F8-D	020731-F8-D-3.0	3.0	3.1
Field 9			
F9-A	020801-F9-A-0.5	0.5	15
F9-C	020801-F9-C-3.0	3.0	3.2
Field 10			
F10-A	020801-F10-A-0.5	0.5	9.2
F10-A	020801-F10-A-3.0	3.0	2.4
F10-B	020801-F10-B-0.5	0.5	7.6
F10-B	020801-F10-B-3.0	3.0	3.7
Field 11			
F11-A	020801-F11-A-0.5	0.5	10
F11-A	020801-F11-A-3.0	3.0	2.2

Table 9
Results of Arsenic Analyses

Boring	Sample Name	Soil Sample Depth (ft bgs) ^[1]	Arsenic Concentration (mg/kg)
Field 11 continued			
F11-B	020801-F11-B-0.5	0.5	8.2
F11-B	020801-F11-B-3.0	3.0	2.5
Field 12			
F12-A	020801-F12-A-0.5	0.5	27
F12-A	020801-F12-A-3.0	3.0	7.7
F12-HA-B	020923-F12-HA-B-0.5	0.5	5.3
Greenhouse			
GH-A	020801-GH-A-0.5	0.5	13
GH-A	020801-GH-A-3.0	3.0	2.8
Background			
BG-A	020801-BG-A-0.75	0.75	5.4
BG-A	020801-BG-A-3.0	3.0	5.5
Leach pit			
ENV-1	020923-ENV-1-7.0	7.0	ND
ENV-1	020923-ENV-1-10.0	10.0	1.2
Grass Area			
I-GB	030401-GRASS-1-GB	0.5	37
Former Evaporation Pond			
ENV-3	030401-ENV-3-2.0	2.0	20
ENV-3	030401-ENV-3-3.5	3.5	9.7
ENV-3	030401-ENV-3-6.5	6.5	2.8
ENV-3	030401-ENV-3-7.8	7.8	2.9
Sediment Trap			
ENV-2	030401-ENV-2-3.5	3.5	3.5
ENV-2	030401-ENV-2-8.5	8.5	3.2

Notes:

[1] ft bgs = feet below ground surface

[2] Samples were analyzed for arsenic by EPA Method 6010B.

Table 10
Statistical Summary of Arsenic Results

	BAREC Arsenic Concentration (mg/kg)			
	All Data	Shallow ¹	Deep ²	Arsenic less than 20 mg/kg in Field 4 ³
<i>No. of Samples</i>	136	66	72	138
<i>Minimum Concentration</i>	0.5	2.6	0.5	0.5
<i>Maximum Concentration</i>	37.0	37	29	20
<i>Average Concentration</i>	11	16	7	9
<i>Standard Deviation</i>	8.1	7.1	6.0	5.4
<i>t-value</i>	1.7	1.7	1.7	1.7
<i>95% UCL of the Mean</i>	12	18	8	9

Notes:

Calculations exclude decon water sample (020801-DW-A), and Sediment trap liquid sample (030401-SEDPIT-1-W).

¹ Shallow - samples at 0.5 feet below ground surface.

² Deep - samples from greater than 2 feet below ground surface.

³ These statistics are for shallow and deep soil, and it is assumed that arsenic concentrations greater than 20 mg/kg are replaced with arsenic concentrations of 7 mg/kg.

Table 11
Summary of Investigation Results for the Former Leach Pit

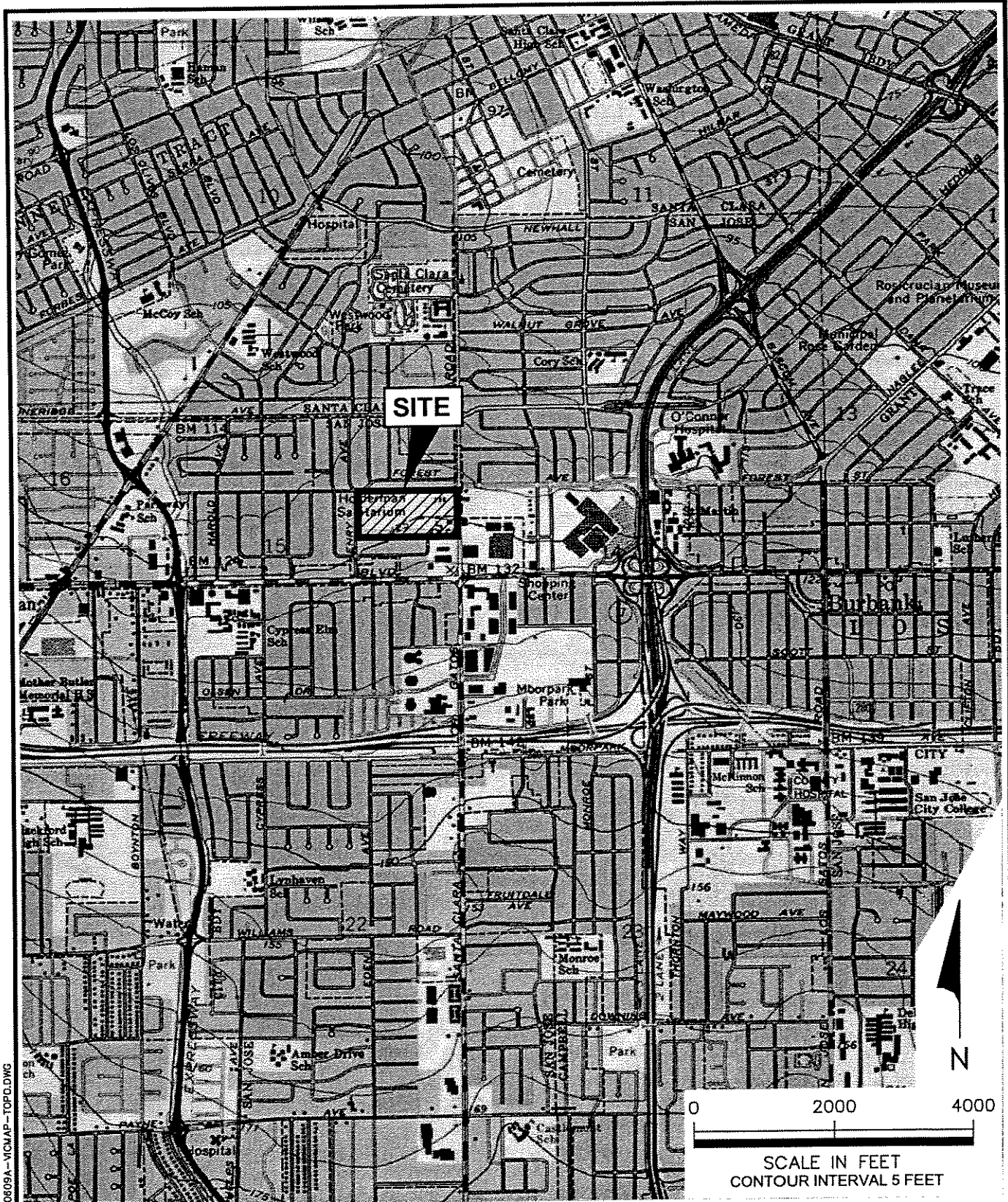
Boring	ENV-1	ENV-1
Sample Name	020923-ENV-1-7.0	020923-ENV-1-10.0
Soil Sample Depth (ft bgs)^[1]	7.0	10.0
Sample Type	Soil	Soil
Sample Date	9/23/2002	9/23/2002
pH	NA	NA
VOCs by EPA Method 8260B	ND	ND
SVOCs by EPA Method 8270C	ND	ND
Organochlorine Pesticides by EPA Method 8081	ND	ND
Inorganic/Metals^[2]		
Antimony	<2.0	<2.0
Arsenic	<1.0	1.2
Barium	12	83
Beryllium	<0.5	<0.5
Cadmium	<0.5	2
Chromium	1.5	32
Cobalt	<1.0	6.6
Copper	2.2	20
Cyanide	NA	NA
Lead	<1.0	4.4
Molybdenum	<1.0	<1.0
Nickel	1.6	38
Selenium	<2.0	<2.0
Silver	<1.0	<1.0
Thallium	<1.0	<1.0
Vanadium	1.9	25
Zinc	5.3	120
Mercury	<0.05	0.11

Notes:

[1] ft bgs = feet below ground surface

[2] Samples were analyzed for metals by EPA Methods 6010B or 7471A.

FIGURES



0310609A-VICMAP-TOPOLDWG

ENVIRON

6001 Shellmound St., Suite 700, Emeryville, CA 94608

Site Location Map

BAREC
90 N. Winchester Blvd.
Santa Clara, California

Figure

1

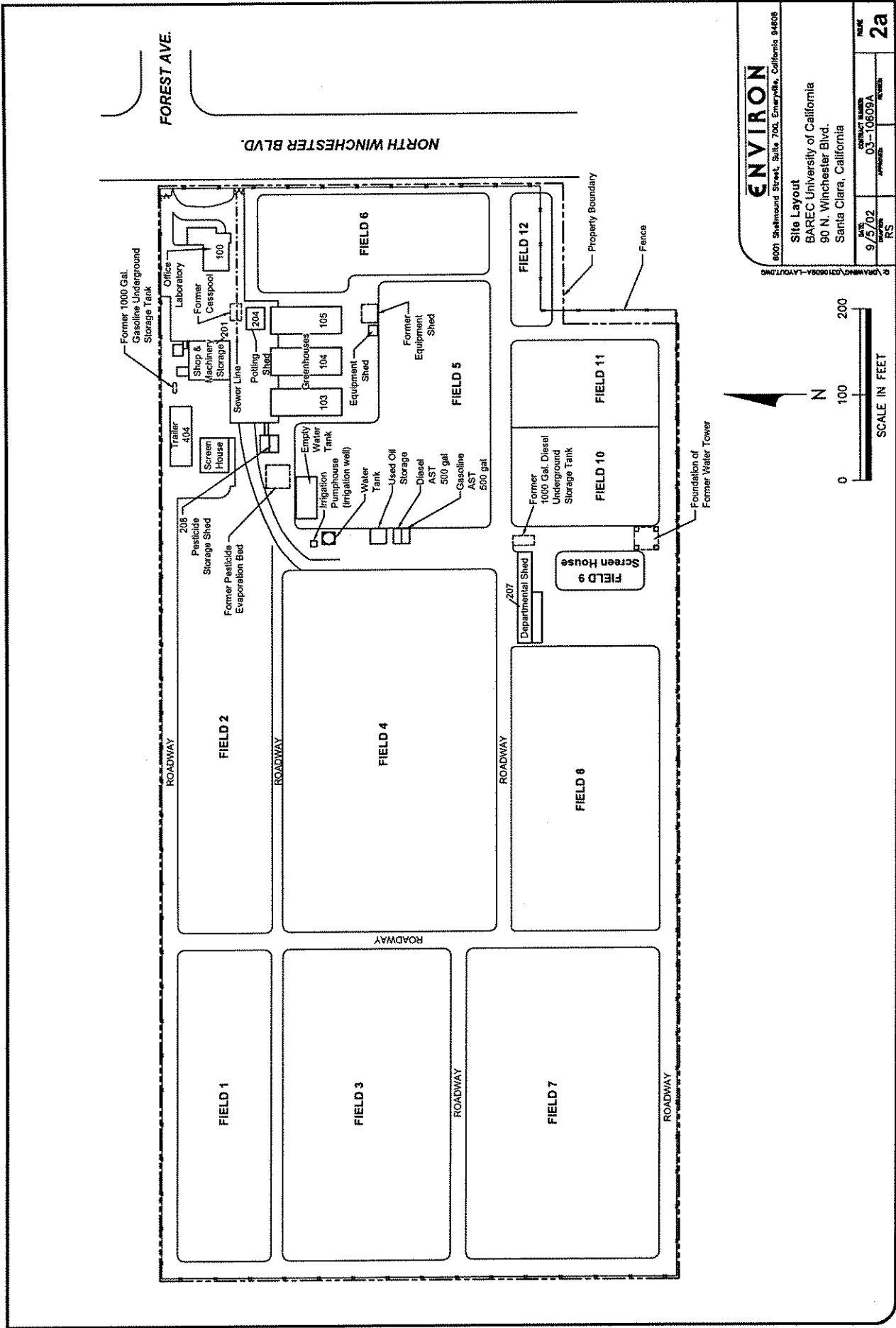
Drafter: RS

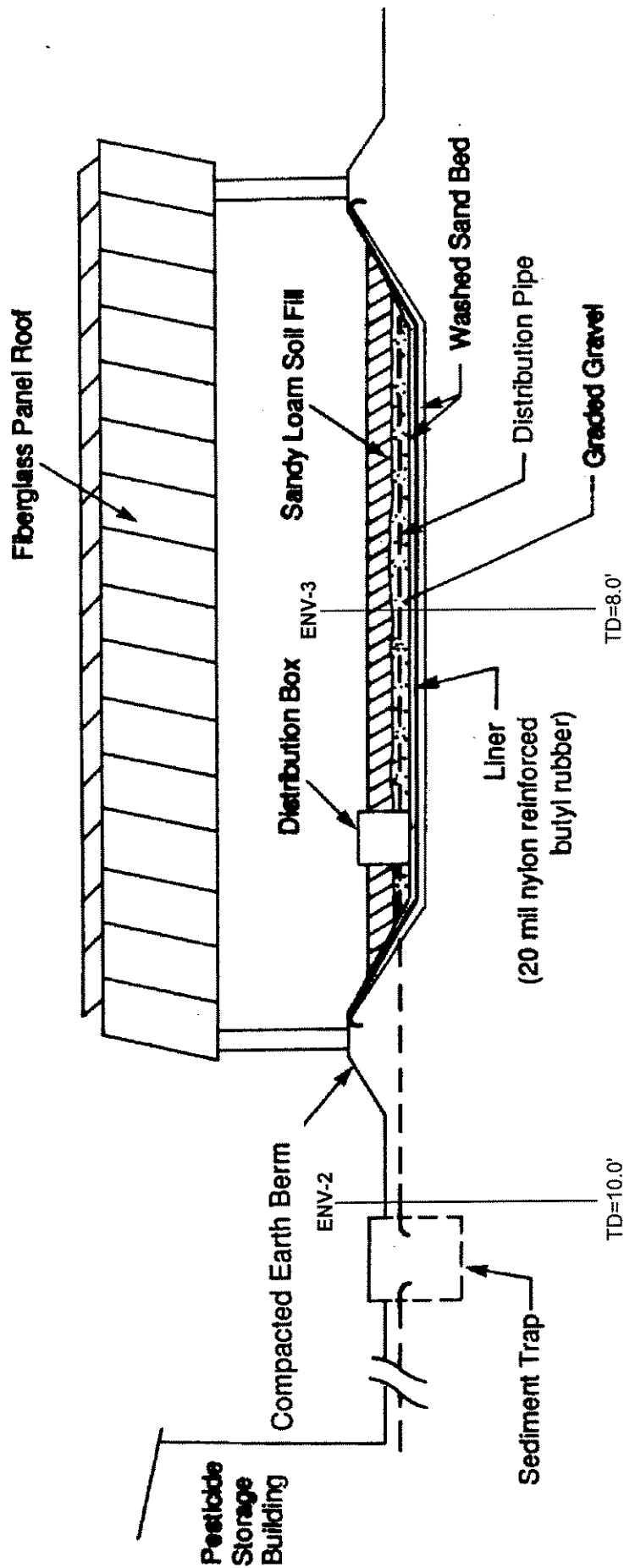
Date: 8/19/02

Contract Number: 03-10609A

Approved:

Revised:

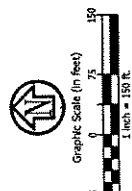
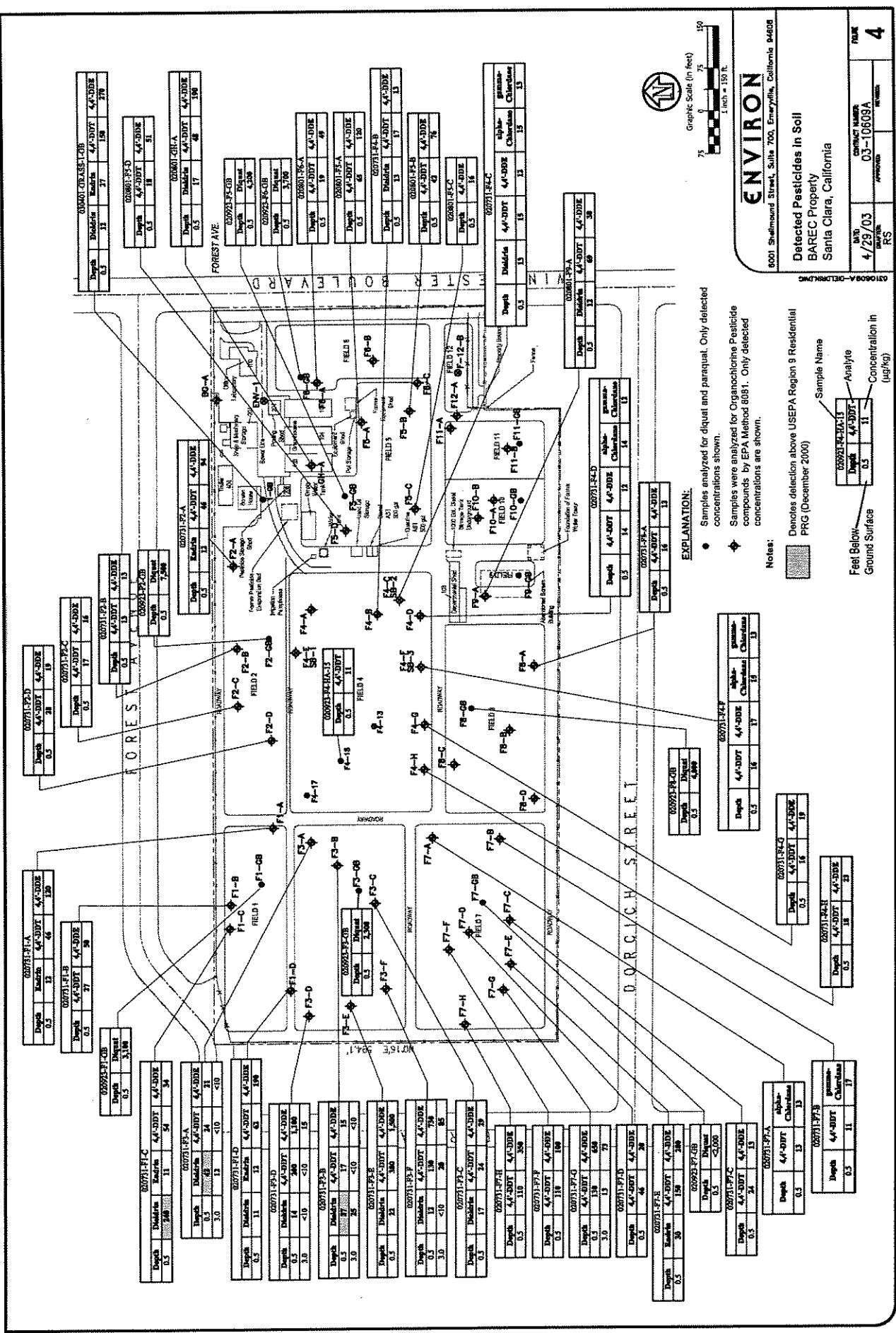




SOURCE: Report of Closure, Former Evaporation Bed, Dames & Moore, April 8, 1998.

<p>ENVIRON</p> <p>6001 Shellmound St., Suite 700, Emeryville, CA 94608</p>	<p>Evaporation Bed Schematic Cross Section</p> <p>BAREC 90 N. Winchester Blvd. Santa Clara, California</p>	<p>Figure 2b</p> <p>Drafter: RS Date: 5/1/03 Contract Number: 03-10609A Approved: Revised:</p>
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0310609a-crosssec.dwg



ENVIRON
9001 Shattuck Street, Suite 700, Emeryville, California 94608

Detected Pesticides in Soil
BAREC Property
Santa Clara, California

DATE
4/29/03

ANALYST
RS

CONTRACT NUMBER
03-10809A

PROJECT
RS

PLANT
4

EXPLANATION:

- Samples analyzed for dieldrin and parathion. Only detected concentrations shown.
- ◆ Samples were analyzed for Organochlorine Pesticide compounds by EPA Method 8081. Only detected concentrations are shown.

Notes:

- Dieldrin detection above USEPA Region 9 Residential PRG (December 2000)

Sample Name: 030921-14-13
Analyte: 4,4'-DDE
Concentration in (ug/kg): 11

Feet Below: 0.3
Ground Surface: 11

Depth	4,4'-DDE	4,4'-DDE
0.5	13	19

Depth	4,4'-DDE	4,4'-DDE
0.5	13	19

Depth	4,4'-DDE	4,4'-DDE
0.5	13	19

Depth	4,4'-DDE	4,4'-DDE
0.5	13	19

Depth	4,4'-DDE	4,4'-DDE
0.5	13	19

Depth	4,4'-DDE	4,4'-DDE
0.5	13	19

Depth	4,4'-DDE	4,4'-DDE
0.5	13	19

Depth	4,4'-DDE	4,4'-DDE
0.5	13	19

Depth	4,4'-DDE	4,4'-DDE
0.5	13	19

Depth	4,4'-DDE	4,4'-DDE
0.5	13	19

Depth	4,4'-DDE	4,4'-DDE
0.5	13	19

Depth	4,4'-DDE	4,4'-DDE
0.5	13	19

Depth	4,4'-DDE	4,4'-DDE
0.5	13	19

Depth	4,4'-DDE	4,4'-DDE
0.5	13	19

Depth	4,4'-DDE	4,4'-DDE
0.5	13	19

Depth	4,4'-DDE	4,4'-DDE
0.5	13	19

Depth	4,4'-DDE	4,4'-DDE
0.5	13	19

Depth	4,4'-DDE	4,4'-DDE
0.5	13	19

Depth	4,4'-DDE	4,4'-DDE
0.5	13	19

Depth	4,4'-DDE	4,4'-DDE
0.5	13	19

Depth	4,4'-DDE	4,4'-DDE
0.5	13	19

Depth	4,4'-DDE	4,4'-DDE
0.5	13	19

Depth	4,4'-DDE	4,4'-DDE
0.5	13	19

Depth	4,4'-DDE	4,4'-DDE
0.5	13	19

Depth	4,4'-DDE	4,4'-DDE
0.5	13	19

Depth	4,4'-DDE	4,4'-DDE
0.5	13	19

Depth	4,4'-DDE	4,4'-DDE
0.5	13	19

Depth	4,4'-DDE	4,4'-DDE
0.5	13	19

Depth	4,4'-DDE	4,4'-DDE
0.5	13	19

Depth	4,4'-DDE	4,4'-DDE
0.5	13	19

Depth	4,4'-DDE	4,4'-DDE
0.5	13	19

Depth	4,4'-DDE	4,4'-DDE
0.5	13	19

Depth	4,4'-DDE	4,4'-DDE
0.5	13	19

Depth	4,4'-DDE	4,4'-DDE
0.5	13	19

Depth	4,4'-DDE	4,4'-DDE
0.5	13	19

Depth	4,4'-DDE	4,4'-DDE
0.5	13	19

Depth	4,4'-DDE	4,4'-DDE
0.5	13	19

Depth	4,4'-DDE	4,4'-DDE
0.5	13	19

Depth	4,4'-DDE	4,4'-DDE
0.5	13	19

Depth	4,4'-DDE	4,4'-DDE
0.5	13	19

Depth	4,4'-DDE	4,4'-DDE
0.5	13	19

Depth	4,4'-DDE	4,4'-DDE
0.5	13	19

Depth	4,4'-DDE	4,4'-DDE
0.5	13	19

Depth	4,4'-DDE	4,4'-DDE
0.5	13	19

Depth	4,4'-DDE	4,4'-DDE
0.5	13	19

Depth	4,4'-DDE	4,4'-DDE
0.5	13	19

Depth	4,4'-DDE	4,4'-DDE
0.5	13	19

Depth	4,4'-DDE	4,4'-DDE
0.5	13	19

Depth	4,4'-DDE	4,4'-DDE
0.5	13	19

Depth	4,4'-DDE	4,4'-DDE
0.5	13	19

Depth	4,4'-DDE	4,4'-DDE
0.5	13	19

Depth	4,4'-DDE	4,4'-DDE
0.5	13	19

Depth	4,4'-DDE	4,4'-DDE
0.5	13	19

Depth	4,4'-DDE	4,4'-DDE
0.5	13	19

Depth	4,4'-DDE	4,4'-DDE
0.5	13	19

Depth	4,4'-DDE	4,4'-DDE
0.5	13	19

Depth	4,4'-DDE	4,4'-DDE
0.5	13	19

FOREST AVENUE

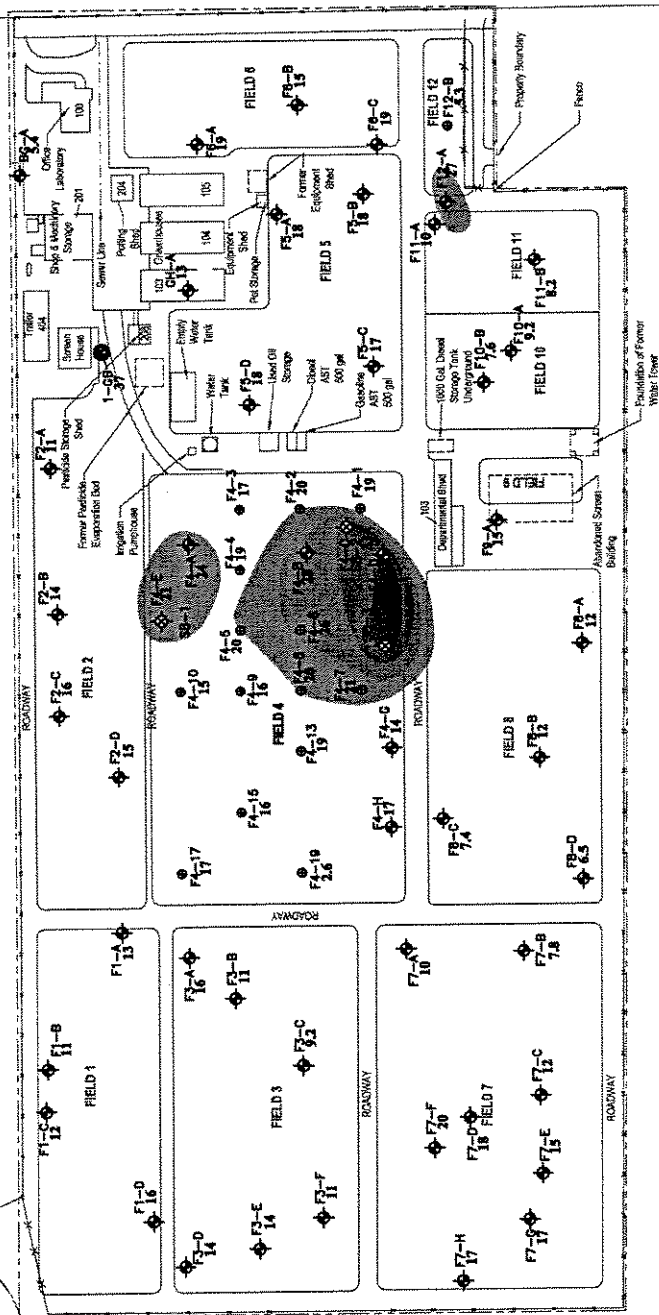
WINCHESTER BOULEVARD

DORCICH STREET

CONCENTRATION RANGES:



Graphic Scale (in feet)



EXPLANATION:

- SB-2 Direct Push Soil Sample
- F4-1 Hand Auger Soil Sample 9/23/02
- F4-3 Hand Auger Soil Sample 7/31 - 8/1/02
- Hand Auger Soil Sample 4/1/03
- 15 Arsenic Concentration (mg/kg)

ENVIRON

8001 Shalmsound Street, Suite 700, Emeryville, California 94608

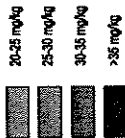
**Isoconcentration Map of Arsenic
above 20 mg/kg at 0.5 ft bgs**

BAREC Property
Santa Clara, California

DATE	4/29/03	CONTRACT NUMBER	03-10609A	PAGE	5
BY	NS	APPROVED		REVISION	

FOREST AVENUE

CONCENTRATION RANGES:



WINCHESTER BOULEVARD



1 inch = 120 ft.

ENVIRON

8001 Shelburne Street, Suite 700, Emeryville, California 94608

Isococoncentration Map of Arsenic
above 20 mg/kg at 3.0 to 3.5 ft bgs

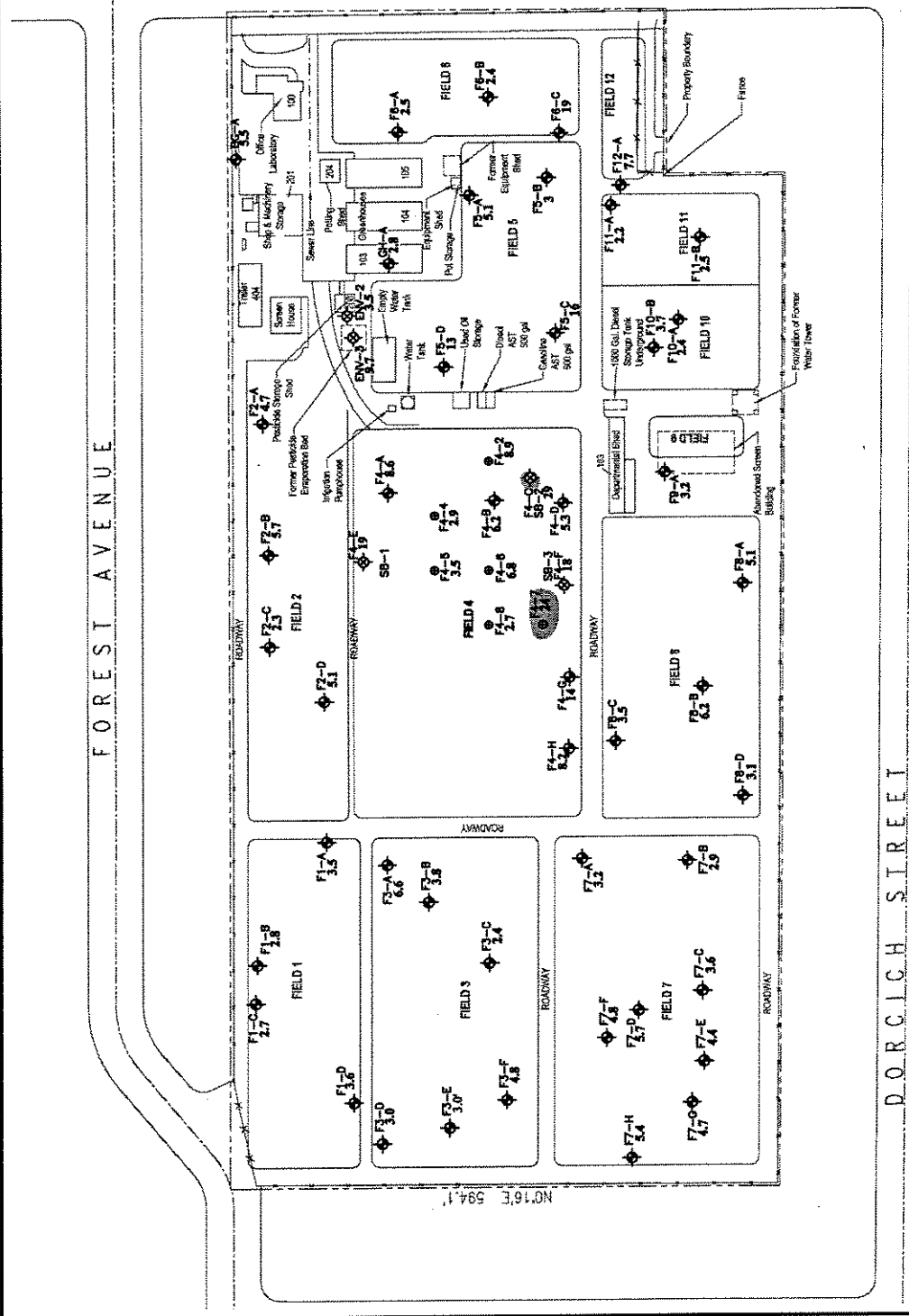
BAREC Property

Santa Clara, California

DATE	CONTRACT NUMBER	SCALE
4/29/03	03-10609A	6
APPROVED	REVISED	
RS		

EXPLANATION:

- SB-2 Direct Push Soil Sample
- F4-1 Hand Auger Soil Sample 9/23/02
- F4-3 Hand Auger Soil Sample 7/31 - 8/1/02
- Hand Auger Soil Sample 4/1/03
- 15 Arsenic Concentration (mg/kg)



DORCHICH STREET

Figure 7
Histogram of Arsenic Concentrations in Shallow Soil (0.5 feet bgs)

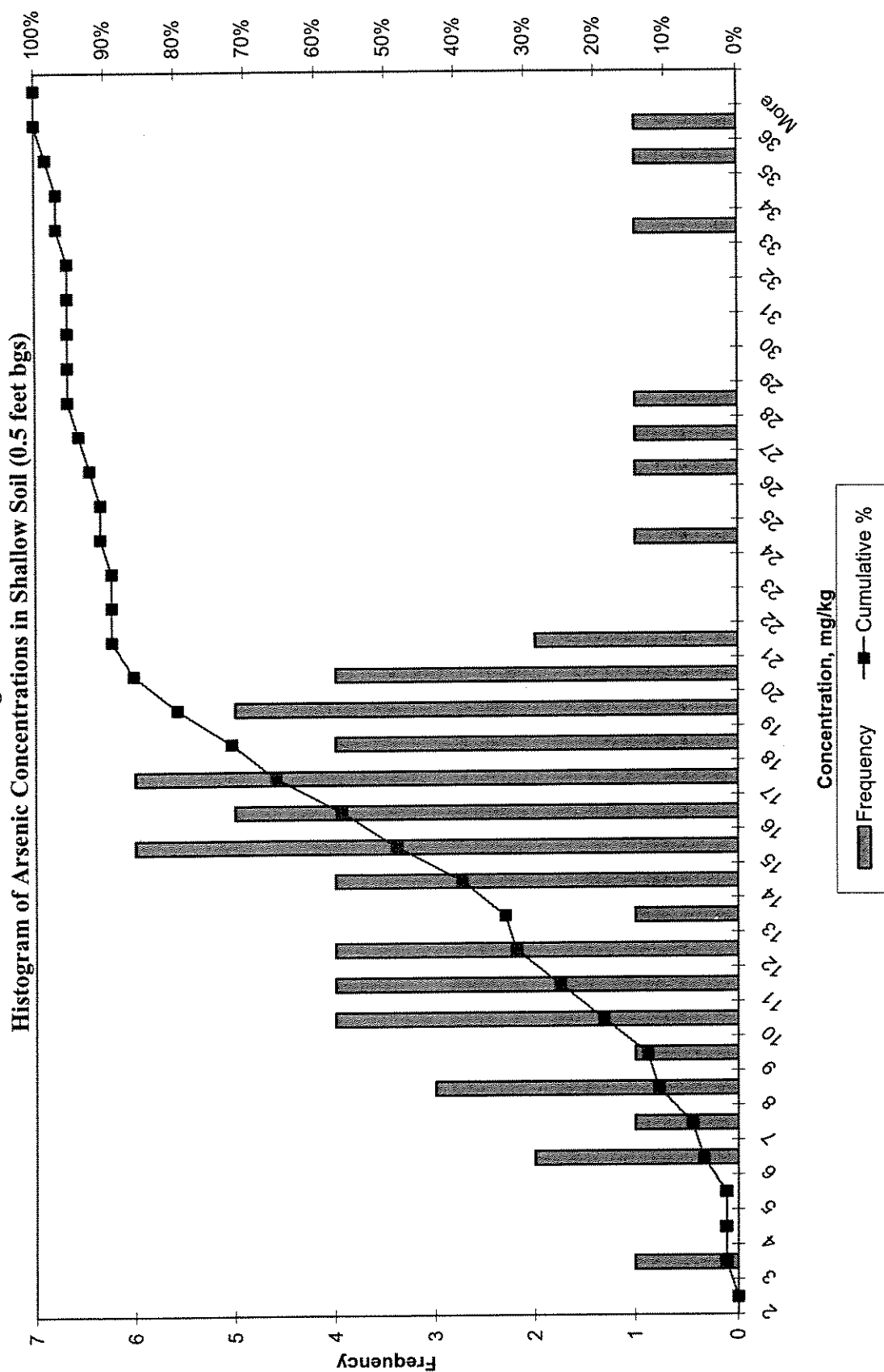
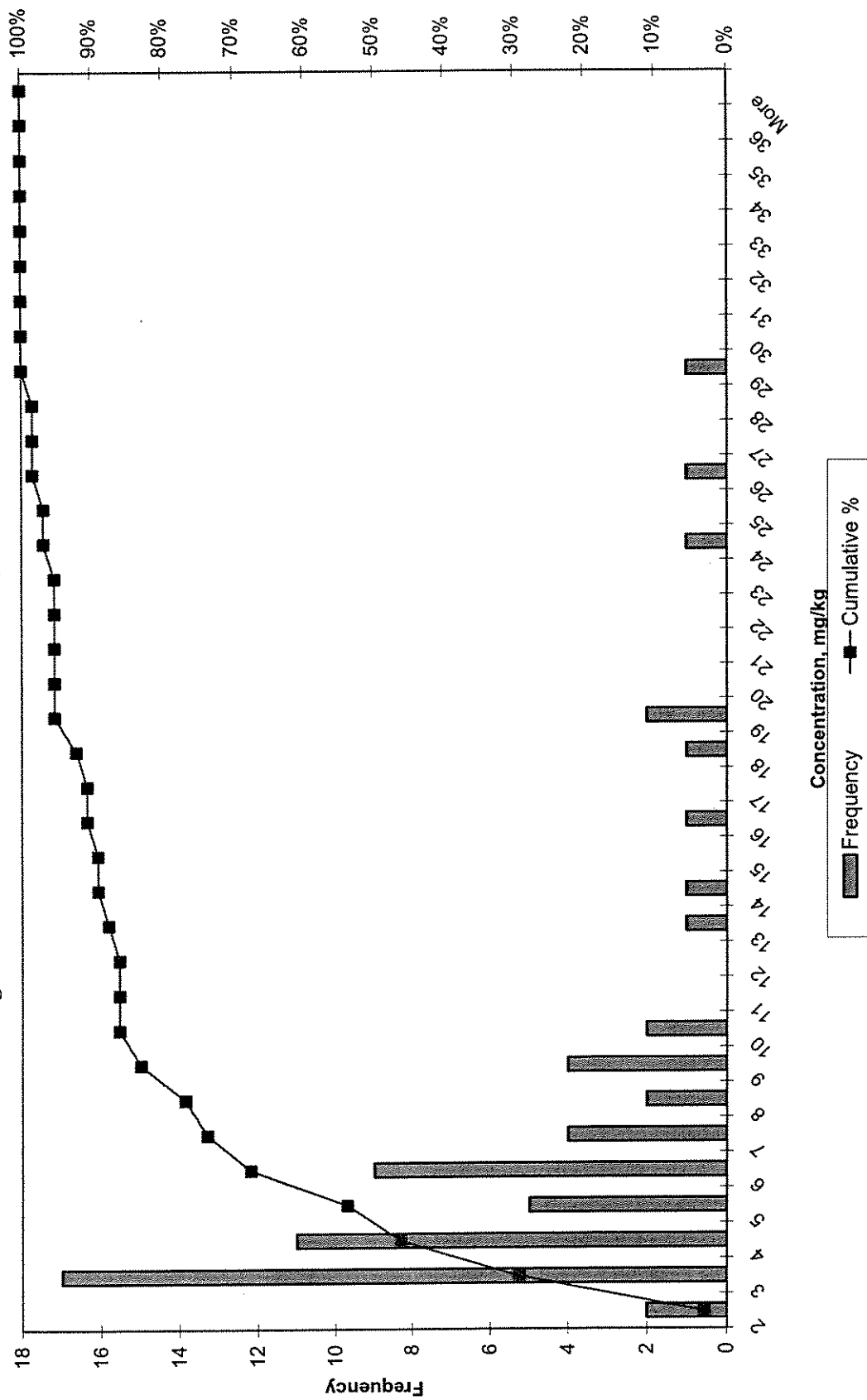


Figure 8
Histogram of Arsenic Concentrations in Deeper Soil (2 to 4 feet bgs)



APPENDIX A

PESTICIDE USE SUMMARY

Appendix A
Pesticide Use Summary

Year	Pesticide Name	Chemical Name
1979	Round Up	Isopropylamine Salt of glyphosate
	Chevron Ortho Paraquat	Paraquat Dichloride
	Phytar 560	Sodium Cacodylate
	Vendex 50WP	Fenbutatin-Oxide [Hexakis (2-Methyl-2-Phenylpropyl) distannoxane]
	Pipron	Piperalin: 3-(2-methylpiperidino)propyl-3,4-dichlorobenzoate
	Pentho-WP	Bis (Pentachloro - 2,4 - cyclopentadien, 1,yl)
1980	Chevron Ortho Paraquat	Paraquat Dichloride
	Phytar 560	Sodium Cacodylate
	Orthene 755	Acephate
	Round up	Isopropylamine Salt of glyphosate
	Pipron	Piperalin: 3-(2-methylpiperidino)propyl-3,4-dichlorobenzoate
	Kocide 101	Copper Hydroxide
	Flowable Sulphur	Sulphur
1981	Phytar 560	Sodium Cacodylate
	Chevron Ortho Paraquat	Paraquat Dichloride
	Flowable Sulphur	Sulphur
	Round Up	Isopropylamine Salt of glyphosate
1983	Triforine	Triforine
	Round Up	Isopropylamine Salt of glyphosate
	Montar	Sodium Cacodylate/Cacodylic Acid
1984	Diquat	diquat dibromide
	Plictran	Cyhexatin
	Diazinon	O,O-Diethyl O-(2-isopropyl-6-methyl-4-pyrimidinyl) Phosphorothioate
	Kocide 101 copper	Copper Hydroxide
	Montar	Sodium Cacodylate/Cacodylic Acid
	Pentac	Bis (Pentachloro - 2,4 - cyclopentadien, 1,yl)
	Round Up	Isopropylamine Salt of glyphosate
	Orthene 755	Acephate
	Diquat	diquat dibromide
	Triforine	Triforine
	Heavy Dormant Oil	Petroleum Oil
1985	Surflan	Oryzalin
	Triforine	Triforine
	Heavy Dormant Oil	Petroleum Oil
	Diazinon	O,O-Diethyl O-(2-isopropyl-6-methyl-4-pyrimidinyl) Phosphorothioate
	Kocide 101 Copper	Copper Hydroxide
	Devrinol	Napropamide
	Montar	Sodium Cacodylate/Cacodylic Acid
	Round Up	Isopropylamine Salt of glyphosate
	Doo Spray	Dinitro (1-methyl heptyl)**phenyl crotomate
	Dacthal W-75	Dimethyl 2,3,5,6-tetrachloro-1,4-benzene-dicarboxylate; Chlorthal-dimethyl; DCPA; TCTP; Dimethyl tetrachloroterephthalate)
	Doo Spray	Dinitro (1-methyl heptyl)**phenyl crotomate
	Diquat	diquat dibromide
	Round Up	Isopropylamine Salt of glyphosate
	Kocide 101	Copper Hydroxide
1986	Aatrex Nine-O	Atrazine
	Devrinol 50WP	Napropamide
	Dacthal W-75	Dimethyl 2,3,5,6-tetrachloro-1,4-benzene-dicarboxylate; Chlorthal-dimethyl; DCPA; TCTP; Dimethyl
	Triforine	Triforine
	Surflan AS	Oryzalin
	Doo Spray	Dinitro (1-methyl heptyl)**phenyl crotomate
	Diquat	diquat dibromide
	Round Up	Isopropylamine Salt of glyphosate
	Kocide 101	Copper Hydroxide
1987	Funginex	Triforine
	Surflan AS	Oryzalin
	Diazinon 50W	O,O-Diethyl O-(2-isopropyl-6-methyl-4-pyrimidinyl) Phosphorothioate
	Diquat	diquat dibromide
	Kocide 101	Copper Hydroxide
	Round Up	Isopropylamine Salt of glyphosate
	Triforine	Triforine
	Dacthal W-75	Dimethyl 2,3,5,6-tetrachloro-1,4-benzene-dicarboxylate; Chlorthal-dimethyl; DCPA; TCTP; Dimethyl tetrachloroterephthalate)
1988	Devrinol 50WP	Napropamide
	Round Up	Isopropylamine Salt of glyphosate
	Malathion 50	Malathion

Year	Pesticide Name	Chemical Name
	Kerb 50WP	Promanide
	Pentac WP	Calcium Lignosulfonate
	Diquat	Bis (Pentachloro – 2,4 – cyclopentadien,1,y)
	Aatrex Nine-O	diquat dibromide
	Dacthal W-75	Atrazine
	Mavrik	Dimethyl 2,3,5,6-tetrachloro-1,4-benzene-dicarboxylate; Chlorthal-dimethyl; DCPA; TCTP; Dimethyl tetrachloroterephthalate)
1989	Mavrik	Tau-Fluvalinate
	Dacthal W-75	Dimethyl 2,3,5,6-tetrachloro-1,4-benzene-dicarboxylate; Chlorthal-dimethyl; DCPA; TCTP; Dimethyl tetrachloroterephthalate)
	Diquat	diquat dibromide
	Vendex	Fenbutatin-Oxide [Hexakis (2-Methyl-2-Phenylpropyl) distannoxane]
	Round Up	Isopropylamine Salt of glyphosate
	Orthene	Acephate
	Funginex	Triforine
1990	Orthene	Acephate
	Mavrik Aquaflow	Tau-Fluvalinate
	Omite 30W	Propargite
	Funginex	Triforine
	Round up	Isopropylamine Salt of glyphosate
	Aatrex Nine-O	Atrazine
	Dimilin 25W	Diifluron
	Ronstar 50WP	Oxadiazon
	Ronstar G	Oxadiazon
	Trimec	Dimethylamine salt of (MCP) 2-(2-methyl-4-chlorophenoxy propionic acid
		Dimethylamine salt of 2,4-dichlorophenoxy acetic acid
		Dimethylamine salt of dicamba (3,6-dichloro-O-anisic acid)
	Malathion	Malathion
	Diazinon	O,O-Diethyl O-(2-isopropyl-6-methyl-4-pyrimidinyl) Phosphorothioate
	Turfion Ester	Triclopyr, butoxyethyl ester
		Kerosene
	Spreader X77	Alkylaryl polyoxyethylene ether
	Diquat	diquat dibromide
	Guthion	O,O-Dimethyl S-(4-oxo-1,2,3-benzotriazin-3(4H)-yl)methylphosphorodithioate
1991	Round Up	Isopropylamine Salt of glyphosate
	Orthene	Acephate
	Funginex	Triforine
	Aatrex Nine-O	Atrazine
	Diazinon	O,O-Diethyl O-(2-isopropyl-6-methyl-4-pyrimidinyl) Phosphorothioate
	Trimec	Dimethylamine salt of (MCP) 2-(2-methyl-4-chlorophenoxy propionic acid
		Dimethylamine salt of 2,4-dichlorophenoxy acetic acid
		Dimethylamine salt of dicamba (3,6-dichloro-O-anisic acid)
	Ronstar-G	Oxadiazon
	Poast	Sethoxydim: 2-[1-(ethoxymino)butyl]-5-[2-(ethylthio)propyl]-3-hydroxy-2-cyclohexen-1-one*
	Herbimax	Petroleum Hydrocarbons (Light Paraffinic Distillate, odorless aliphatic petroleum solvent)
	Diquat	diquat dibromide
	Spreader X77	Alkylaryl polyoxyethylene ether
	Malathion	Malathion
	Benlate	Benomyl (methyl 1-(butylcarbamoyl)-2-benzimidazolecarbamate)
1992	Ronstar-G	Oxadiazon
	Round up	Isopropylamine Salt of glyphosate
	Aatrex Nine-O	Atrazine
	Dacthal W-75	Dimethyl 2,3,5,6-tetrachloro-1,4-benzene-dicarboxylate; Chlorthal-dimethyl; DCPA; TCTP; Dimethyl
	Ronstar 50 WP	Oxadiazon
	Diquat	diquat dibromide
	Spreader X77	Alkylaryl polyoxyethylene ether
	26019 Fungicide	Iprodione
	Primo/Experimental	cimectacarb 4-(cyclopropyl-alpha-hydroxy-methylene)-3,5-dioxo-cyclohexanecarboxylic acid ethyl ester
	Citridal	Not found
	Daconil 2787 75WP	Chloroethalonil
		Kaolin
	Benlate	Benomyl (methyl 1-(butylcarbamoyl)-2-benzimidazolecarbamate)
	Surflan	Oryzalin
	Pre M 60 WDG	Pendimethalin
	Dimension 1E	Dithiopyr
	Promiadine 65 WDG	Experimental (Not found)
	Team 2g	Benefin
		Trifluralin
	Snapshot 2.5g	Trifluralin
		Isoxaben

Year	Pesticide Name	Chemical Name
	Balan 60 WDG	Benefin
	Treflan	Trifluralin
	Gallery 75DF	Isoxaben
	Betasan 4E	Bensulide
1993	Diazinon	O,O-Diethyl O-(2-isopropyl-6-methyl-4-pyrimidinyl) Phosphorothioate
	Round up	Isopropylamine Salt of glyphosate
	Omite 30W	Propargite
	XL 2G	Benefin
		Oryzalin
	Trimec	Dimethylamine salt of (MCP) 2-(2-methyl-4-chlorophenoxy propionic acid Dimethylamine salt of 2,4-dichlorophenoxy acetic acid Dimethylamine salt of dicamba (3,6-dichloro-O-anisic acid)
	Ronstar 50WP	Oxadiazon
	Pennant (L)	Metolachlor
	Surflan AS	Oryzalin
	Gallery 75F	Isoxaben
	Pendulum WDG	Pendimethalin
	Malathion	Malathion
	Treflan EC	Trifluralin
	Aatrex Nine-O	Atrazine
	Spreader X77	Alkylaryl polyoxyethylene ether
	Diquat	diquat dibromide
	Surflan	Oryzalin
	Ronstar G	Oxadiazon
	Diazinon	O,O-Diethyl O-(2-isopropyl-6-methyl-4-pyrimidinyl) Phosphorothioate
	Basamid	Dazomet
	Vapam	Sodium methylthiocarbamate (anhydrous)
	Weedar 64	2,4-d DMA Salt
	Acclaim 1E	Fenoxaprop-p-ethyl
	Turfion 4E	Triclopyr, butoxyethyl ester
	Bueno 6	Monosodium acid methanearsonate
	Benlate	Benomyl (methyl 1-(butylcarbomyl)-2-benzimidazolecarbamate)
	Turfion Ester	Triclopyr, butoxyethyl ester Kerosene
1994	Round Up	Isopropylamine Salt of glyphosate
	Malathion	Malathion
	Diquat	diquat dibromide
	Spreader X77	Alkylaryl polyoxyethylene ether
	Avid	Abamectin N-methylpyrrolidone
	Orthene	Acephate
	Turfion Ester	Triclopyr, butoxyethyl ester Kerosene
	Herbimax	Petroleum Hydrocarbons (Light Paraffinic Distillate, odorless aliphatic petroleum solvent)
	Surflan	Oryzalin
	Aatrex Nine-O	Atrazine
	Eagle	Myclobutanil
	Trimec	Dimethylamine salt of (MCP) 2-(2-methyl-4-chlorophenoxy propionic acid Dimethylamine salt of 2,4-dichlorophenoxy acetic acid Dimethylamine salt of dicamba (3,6-dichloro-O-anisic acid)
	Safer Soap	Potassium salts of fatty acids
	Funginex	Triforine
	Ronstar G	Oxadiazon
1995	Round Up	Isopropylamine Salt of glyphosate
	Malathion	Malathion
	Turfion Ester	Triclopyr, butoxyethyl ester Kerosene
	Reward	diquat dibromide
	Aatrex Nine-O	Atrazine
	Diazinon	O,O-Diethyl O-(2-isopropyl-6-methyl-4-pyrimidinyl) Phosphorothioate
	Diquat	diquat dibromide
	Trimec	Dimethylamine salt of (MCP) 2-(2-methyl-4-chlorophenoxy propionic acid Dimethylamine salt of 2,4-dichlorophenoxy acetic acid Dimethylamine salt of dicamba (3,6-dichloro-O-anisic acid)
	Atrimmec PGR	Dikegulac-sodium (Sodium salt of 2,3:4,6-bis-O-(1-methylethylidene)-a-L-xylo-2-hexulofuranosonic acid)
	Spreader X77	Alkylaryl polyoxyethylene ether
1996	Omite 30W	Propargite
	Reward	diquat dibromide
	Spreader X77	Alkylaryl polyoxyethylene ether
	Atrimmec PGR	Dikegulac-sodium (Sodium salt of 2,3:4,6-bis-O-(1-methylethylidene)-a-L-xylo-2-hexulofuranosonic acid)

Year	Pesticide Name	Chemical Name
	Trimec	Dimethylamine salt of (MCP) 2-(2-methyl-4-chlorophenoxy propionic acid) Dimethylamine salt of 2,4-dichlorophenoxy acetic acid Dimethylamine salt of dicamba (3,6-dichloro-O-anisic acid)
	Rally 40W	Myclobutanil Kaolin
	Stinger	Clopyralid, monoethanolamine salt
	Weedar 64	2,4-d DMA Salt
	Confront	Triclopyr as triethylamine salt Clopyralid, monoethanolamine salt
	Round up	Isopropylamine Salt of glyphosate
	Aatrex Nine-O	Atrazine
	Round Up Pro	Isopropylamine Salt of glyphosate
	Ace Lawn & Weedkiller	Dimethylamine salt of (MCP) 2-(2-methyl-4-chlorophenoxy propionic acid) Dimethylamine salt of 2,4-dichlorophenoxy acetic acid Dimethylamine salt of dicamba (3,6-dichloro-O-anisic acid)
	Bueno-6	Monosodium acid methanearsonate
	Turfion Ester	Triclopyr, butoxyethyl ester Kerosene
	Ronstar G	Oxadiazon
1997	Round Up Pro	Isopropylamine Salt of glyphosate
	Atrimmec	Dikegulac-sodium (Sodium salt of 2,3:4,6-bis-O-(1-methylethylidene)-a-L-xylo-2-hexulofuranosonic acid)
	Reward	diquat dibromide
	Banvel	Dimethylamine salt of dicamba (3,6-dichloro-O-anisic acid)
	Trimec	Dimethylamine salt of (MCP) 2-(2-methyl-4-chlorophenoxy propionic acid) Dimethylamine salt of 2,4-dichlorophenoxy acetic acid Dimethylamine salt of dicamba (3,6-dichloro-O-anisic acid)
	Gallery	Isoxaben
	Dimension	Dithiopyr
	Pre M	Pendimethalin
	Dacthal	Dimethyl 2,3,5,6-tetrachloro-1,4-benzene-dicarboxylate; Chlorthal-dimethyl; DCPA; TCTP; Dimethyl tetrachloroterephthalate)
	Manage	Halosulfuron-methyl Silica, amorphous precipitated Kaolin
	Thiazopyr	Thiazopyr
	Dimension IEC	Dithiopyr
	Rout	Oxyfluorfen Oryzalin
	Aatrex Nine-O	Atrazine
	Turfion Ester	Triclopyr, butoxyethyl ester Kerosene
	Basagran T/O	Sodium Bentazon
	Buctril	Bromoxynil octanoate 1,2,4 - Trimethylbenzene Xylene Ethylbenzene
	Liberty	Glufosinate - Ammonium
	Weedar 64	2,4-d DMA Salt
	Confront	Clopyralid, monoethanolamine salt Triclopyr as triethylamine salt
	Daconate 6	Monosodium acid methanearsonate
	Transline	Clopyralid, monoethanolamine salt
	Barricade	Proflam
	Spreader X77	Alkylaryl polyoxyethylene ether
1998	Buctril	Bromoxynil octanoate 1,2,4 - Trimethylbenzene Xylene Ethylbenzene
	Round up Ultra	Isopropylamine Salt of glyphosate
	Ronstar G	Oxadiazon
	Lorox 50WP	Linuron
	Prowl 3.3 EC	Pendimethalin
	A-Maizing Lawn	Maize Gluten Meal
	Factor 65 WDG	Proflam
	Dimension IL	Dithiopyr
	Finale	Glufosinate - Ammonium
	Snapshot 2.5G	Trifluralin Isoxaben
	Visor 2E	Thiazopyr

Year	Pesticide Name	Chemical Name
		Solvent Naphta, petroleum, heavy aromatic
	Frontier 6	Dimethanamid
	Quinclorac	Quinclorac
	Gallery 75DF	Isoxaben
	RegalStar	Oxadiazon
		Prodiamine
	RegalKade	Prodiamine
	Thiolux	Sulphur
	Kocide DF	Copper Hydroxide
	Trimec	Dimthylamine salt of (MCP) 2-(2-methyl-4-chlorophenoxy propionic acid Dimethylamine salt of 2,4-dichlorophenoxy acetic acid Dimethylamine salt of dicamba (3,6-dichloro-O-anisic acid)
	Atrimmec	Dikegulac-sodium (Sodium salt of 2,3:4,6-bis-O-(1-methylethylidene)-a-L-xylo-2-hexulofuranosonic acid)
	Devrinol 50 DF	Napropamide
	Quadris	Azoxystrobin Technical
	Aatrex Nine-O	Atrazine
	Dual 8E	Metolachlor
	Prefar 4E	Bensulide
	Home Defense #2	Chlorpyrifos
	Round up Pro	Isopropylamine Salt of glyphosate
1999	Round Up Pro	Isopropylamine Salt of glyphosate
	Round Up	Isopropylamine Salt of glyphosate
	Round Up Ultra	Isopropylamine Salt of glyphosate
	Ronstar G	Oxadiazon
	Trimec	Dimthylamine salt of (MCP) 2-(2-methyl-4-chlorophenoxy propionic acid Dimethylamine salt of 2,4-dichlorophenoxy acetic acid Dimethylamine salt of dicamba (3,6-dichloro-O-anisic acid)
	Aatrex Nine-O	Atrazine
	Dual 8E	Metolachlor
	Atrimmec	Dikegulac-sodium (Sodium salt of 2,3:4,6-bis-O-(1-methylethylidene)-a-L-xylo-2-hexulofuranosonic acid)
	Turfion Ester	Triclopyr, butoxyethyl ester Kerosene
	Goal 1.6 E	Oxyfluorfen
	Devrinol 50DF	Napropamide
	Banvel	Dimethylamine salt of dicamba (3,6-dichloro-O-anisic acid)
	Subdue Max	Mefenoxam
	Methyl Bromide	Methyl Bromide
	Telone C35 EC	1,3 - Dichloropropene
		Chloropicrin
	Chloropicrin	Chloropicrin
	Vapam HL	Sodium methylthiocarbamate (anhydrous)
	Carcentrazone	Carfentrazone-ethyl Silica, amorphous precipitated Lignosulfate acid, sodium salt
	Sulfentrazone	Sulfentrazone
	Isoxaben	Isoxaben
	Confront	Clopylarid, monoethanolamine salt Triclopyr as triethylamine salt
	Turfion	Triclopyr, butoxyethyl ester
	Stinger	Clopylarid, monoethanolamine salt
	Fusilade II	Fluazifop - P - Butyl Technidal Naphtalene 1,2,4 - Trimethylbenzene
	Azafenidin	Experimental (Not found)
	Flumioxazin	Experimental (Not found)
	Pendimethalin	Pendimethalin
	Isoxaben	Isoxaben
	Dithiopyr	Dithiopyr
	Dimethanamid	Dimethanamid
	Oxadiazon	Oxadiazon
	Trifluralin	Trifluralin
	Pendulum 2G	Pendimethalin
	Prowl	Pendimethalin
	Gramaxone	Paraquat Dichloride
	Spreader X77	Alkylaryl polyoxyethylene ether
2000	Round Up Ultra	Isopropylamine Salt of glyphosate
	Zeneca Paraquat	Paraquat Dichloride
	Buctril	Bromoxynil octanoate 1,2,4 - Trimethylbenzene

Year	Pesticide Name	Chemical Name
		Xylene
		Ethylbenzene
	Abamectin	Abamectin
	Terpinoid cmpds (kairomones)	Experimental (Not found)
	Cinnamaldehyde	Beauveria Bassiana Strain GHA
	Hydrazine carboxylic acid	Experimental (Not found)
	Fenpropathrin	Fenpropathrin
		Naphtalene
	Oxazole	Experimental (Not found)
	Experimental	Experimental (Not found)
	Milbemectin	Experimental (Not found)
	Chloropyridazin	Pyridaben
	Hexythiazox	Hexythiazox
	Potassium Salts of fatty Acids	Potassium salts of fatty acids
	Round Up Pro	Isopropylamine Salt of glyphosate
	Round Up	Isopropylamine Salt of glyphosate
	Naphtalenedione	Experimental (Not found)
	Agrimek	Abamectin
		N-methylpirrolidone
	Aatrex 90	Atrazine
	Dual 8E	Metolachlor
	Dual Magnum	S-Metolachlor
	Banvel	Dimethylamine salt of dicamba (3,6-dichloro-O-anisic acid)
	Ronstar G	Oxadiazon
	Pendulum 2G	Pendimethalin
	Prowl	Pendimethalin
2001	Round Up Pro	Isopropylamine Salt of glyphosate
	Goal	Oxyfluorfen
	Buctril	Bromoxynil octanoate
		1,2,4 - Trimethylbenzene
		Xylene
		Ethylbenzene
	Aatrex Nine-O	Atrazine
	Prowl 3.3 EC	Pendimethalin
	Round Up Ultra	Isopropylamine Salt of glyphosate
	Up John Enide 50W	Not found
2002	Ronstar G	Oxadiazon
	Round Up Pro	Isopropylamine Salt of glyphosate
	Goal 2XL	Oxyfluorfen
		N-methylpirrolidone
		Naphtalene
	Round Up Ultra	Isopropylamine Salt of glyphosate
	Banvel	Dimethylamine salt of dicamba (3,6-dichloro-O-anisic acid)
	Aatrex 4L	Atrazine
	Dual Magnum	S-Metolachlor
	Sevin 5 Balt	Carbaryl

APPENDIX B

LABORATORY DATA REPORTS

(PROVIDED TO DTSC FILE COPY ONLY)